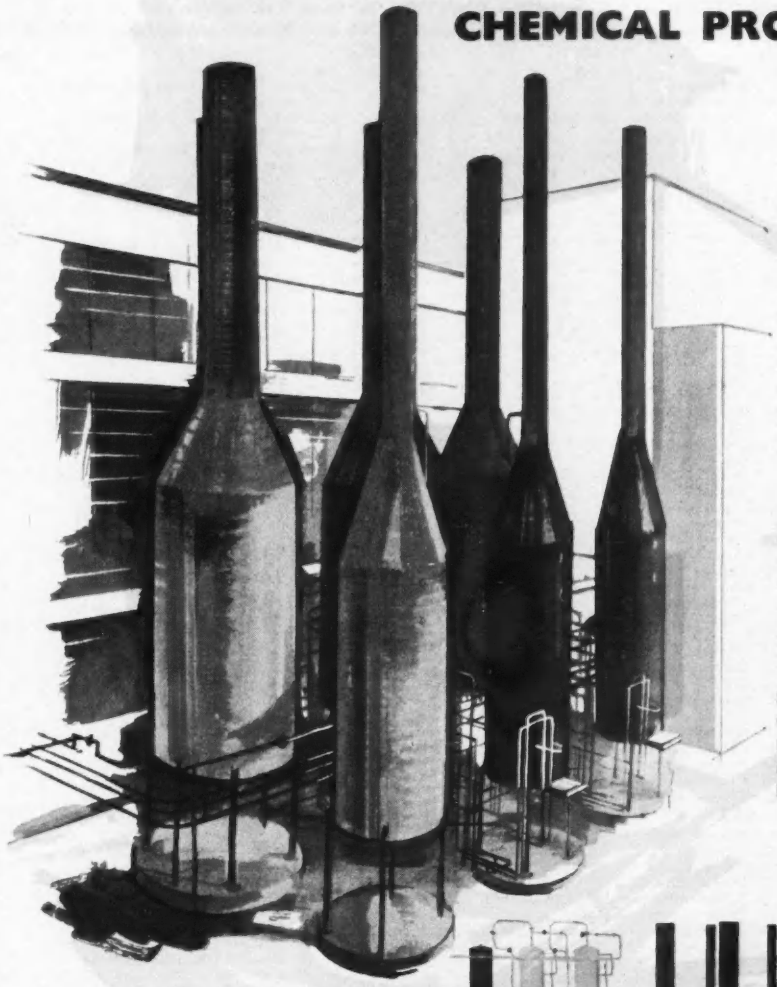
Chemical Age

POLAND'S EXPANSION PROGRAMME
(page 655)

VOL. 81 No. 2075

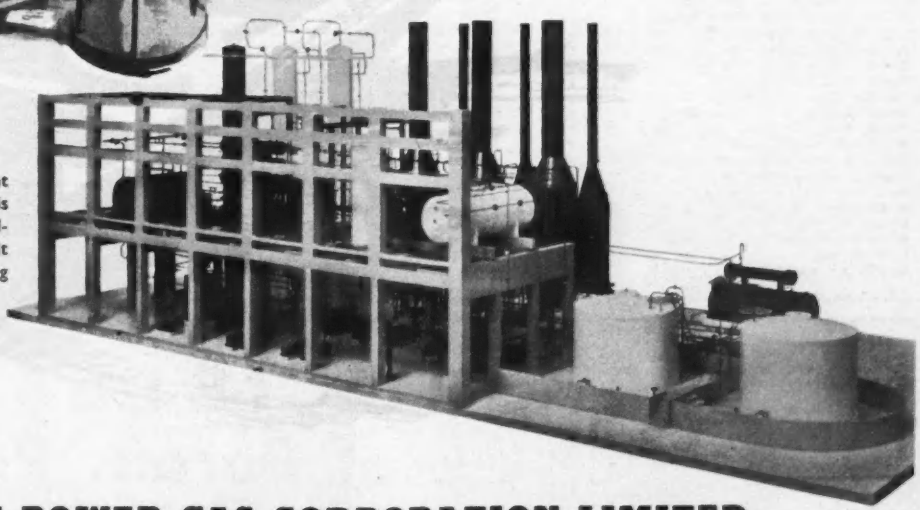
18 April 1959

CHEMICAL PROCESS PLANT



The chemical plant division of the Power-Gas Group specialises in the provision of chemical process plant and equipment, often in association with world specialists in particular fields.
It draws upon the resources of the Group to provide either process engineering or a comprehensive turnkey service covering all phases from the initial conception to the handing over of a producing unit.

Synthesis gas from oil
Ammonia plant
Ammonium sulphate
Carbon monoxide shift catalyst
Pressure conversion of carbon monoxide
Benfield hot carbonate plant
Krystal crystallizers
High purity hydrogen
Sulphuric acid
Gas desulphurization
Package carbon dioxide plant
Dust and fume control and recovery
Lime calcining



Model of Texaco plant producing ammonia synthesis gas from oil and gaseous feedstock with plant layout to fit restricted site with existing buildings.

THE POWER-GAS CORPORATION LIMITED
ASSOCIATED WITH **ASHMORE, BENSON, PEASE & COMPANY**
STOCKTON-ON-TEES AND LONDON

AUSTRALIA · CANADA · INDIA · FRANCE · SOUTH AFRICA

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A

INDEX TO ADVERTISERS

The first figures refer to advertisements in **Chemical Age Directory & Who's Who,** *the second to the current issue*

(continued on page 640)

Who are you supposed to be?

A Shell Chemical's chemist.

What are you making?

S.B.A. . . . secondary butyl alcohol.

Do Shell make secondary-what-you-said?

I'll say they do—and they have a super delivery service.

SHELL CHEMICAL COMPANY LIMITED

In association with Petrochemicals Limited and Styrene Products Limited

Divisional Offices:

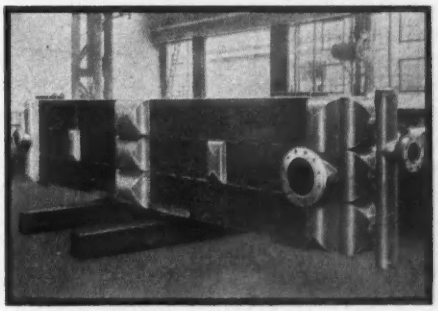
LONDON	Norman House, 105-9, Strand, W.C.2. Tel: TEMple Bar 4455.
MANCHESTER	144-6, Deansgate. Tel: Deansgate 2411.
BIRMINGHAM	14-20, Corporation Street, 2. Tel: Midland 6954.
GLASGOW	124, St. Vincent Street, C.2. Tel: Central 9561.
BELFAST	16-20 Rosemary Street. Tel: Belfast 26094.
DUBLIN	33-34 Westmoreland Street. Tel: Dublin 72114.

SA.1 *A set of these advertisements is available free on request from any of the offices listed above.*

INDEX TO ADVERTISERS

The first figures refer to advertisements in **Chemical Age Directory & Who's Who**, *the second to the current issue*

THE BIGGEST BATH IN EUROPE



We have the biggest flux-dip brazing bath in Europe. It enables us to make the biggest secondary surface light alloy heat-exchangers this side of the Atlantic. But in heat-exchangers sheer size means little without comparable efficiency and reliability. They're the product of experience, and that is something we can also boast about. Marston brought flux-dip brazing to Britain in 1945. That means we've had longer experience of the process than any firm in Britain. It means we've had 14 years to perfect the technique of making the thousands of faultless joints in a secondary surface light alloy heat-exchanger. It also means we have unrivalled knowledge of design. Need we say more?

LIGHT ALLOY HEAT-EXCHANGERS FOR
Industrial · Aircraft · Electronic · Automotive Applications

MARSTON EXCELSIOR LIMITED

A subsidiary company of Imperial Chemical Industries Limited

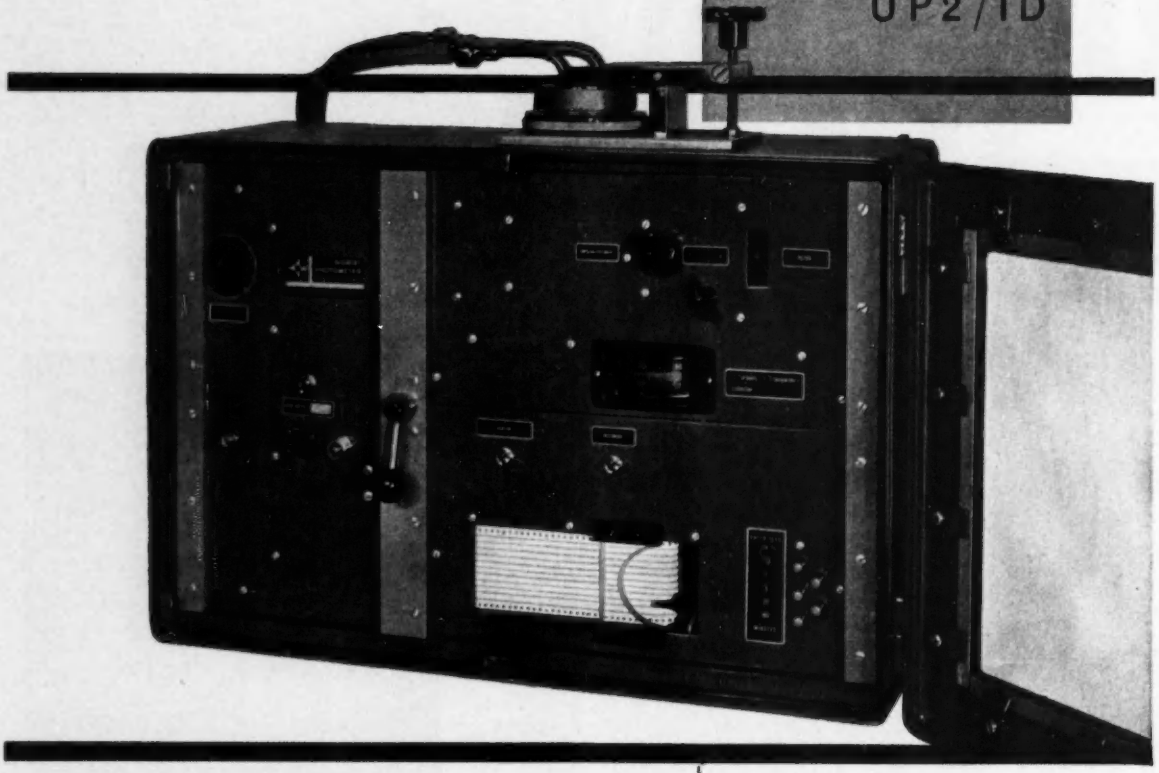
FORDHOUSES · WOLVERHAMPTON · ENGLAND

MAR.261

B

Continuous control of turbidity and absorption in industry

Sigrist Photometer UP2/ID



The Swiss are famous for precision work, some of their products being the best in the world. The Swiss made Sigrist & Weiss Photometer is a fine example, and stands in a class by itself.

This tool takes its rightful place in our range of precision analytical instruments and we are really pleased to have been appointed Sole U.K. Agents for it.

The Sigrist Photometer provides automatic process control by measurement of turbidity or absorption. Among a wide range of applications the following are typical:—continuous control of filtration in water plants, industry and breweries; of separation processes with centrifuges in the food industry; of bacteria cultures (e.g. yeast growth); of decoloration in the sugar industry, oil and margarine industry and chemical industry; and of concentrations by the Lambert-Beer rule.

SPECIFICATION

MEASURING RANGE: For absorption: 366–550 and 550–950 m 29 cm scale graduated in 100% transmission and in logarithmic absorbance 0–1.5. For nephelometry: 2×10^{-6}–6×10^{-2} absolute units.
SENSITIVITY & REPRODUCTIBILITY: 5% of the scale for transmission and turbidity, 2% for absorbance.
FLOW TYPE CELLS: Made of stainless steel or coated brass. Light path: 0.5; 1; 2; 3; 10 or 30 mm.
NEPHELOMETRIC COMPARISON STANDARDS: For determination of measuring range:
$0\text{–}2\times10^{-5}$; $0\text{–}6\times10^{-5}$;
$0\text{–}2\times10^{-4}$; $0\text{–}6\times10^{-4}$
absolute units.
STEEL CASE—SEALED, GALVANISED & VARNISHED: Also available: UP3 with external light path and UP2/ID with monochromator for laboratory use.

SOUTHERN INSTRUMENTS

SOLE DISTRIBUTORS FOR SIGRIST & WEISS ZURICH

REPLY TO THE ANALYTICAL INSTRUMENTS DEPARTMENT SOUTHERN INSTRUMENTS LTD. CAMBERLEY SURREY ENGLAND. CAMBERLEY 3401

PLUG IN **K.I.C.** FOR

ECONOMICAL CHEMICAL PLANT EXPANSION

Organized to serve the oil and chemical industries. Kellogg International Corporation can strengthen the chemical engineering departments of most chemical companies during their expansion programmes. Chemical concerns faced with the problems of executing large and small capital expenditures for new production facilities have found that plugging in the KIC staff to their organization results in an optimum capital investment for their new plants. KIC is equipped to deliver chemical engineering manpower at any point in the planning of a new plant from the early development of a new process through the pilot plant stage, the design of the commercial plant, the procurement of equipment and materials, the erection and finally placing the plant in operation. This broad experience of KIC, plus the additional chemical engineering depth available through The M. W. Kellogg Company in New York, has been used by many chemical concerns to make objective economical analyses of any process schemes as well as to find the answers to specific road blocks in the development of new processes.

By incorporating all the necessary services for assisting in the developing of new processes and designing and constructing new plants under one management team, Kellogg is able to deliver plants which will continue to be modern for years after completion. The constant effort on the part of Kellogg to reduce the risk of obsolescence to an absolute minimum is the best assurance that an investment in a new chemical plant will continue to yield a high return for a long time. KIC engineers welcome the opportunity to explain how KIC co-ordinates and controls the innumerable tasks and expenditures associated with building a new plant.

M KELLOGG W

Kellogg International Corporation

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SOCIETE KELLOGG · PARIS · THE CANADIAN KELLOGG COMPANY LTD · TORONTO
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a vital link

The surveyor is a vital link in the planning and construction of railway sidings which Wards have been building for industry for over 50 years. They have the experience, the technicians, the skilled men and the facilities to carry out contracts of any size.

Thos. W. Ward Ltd

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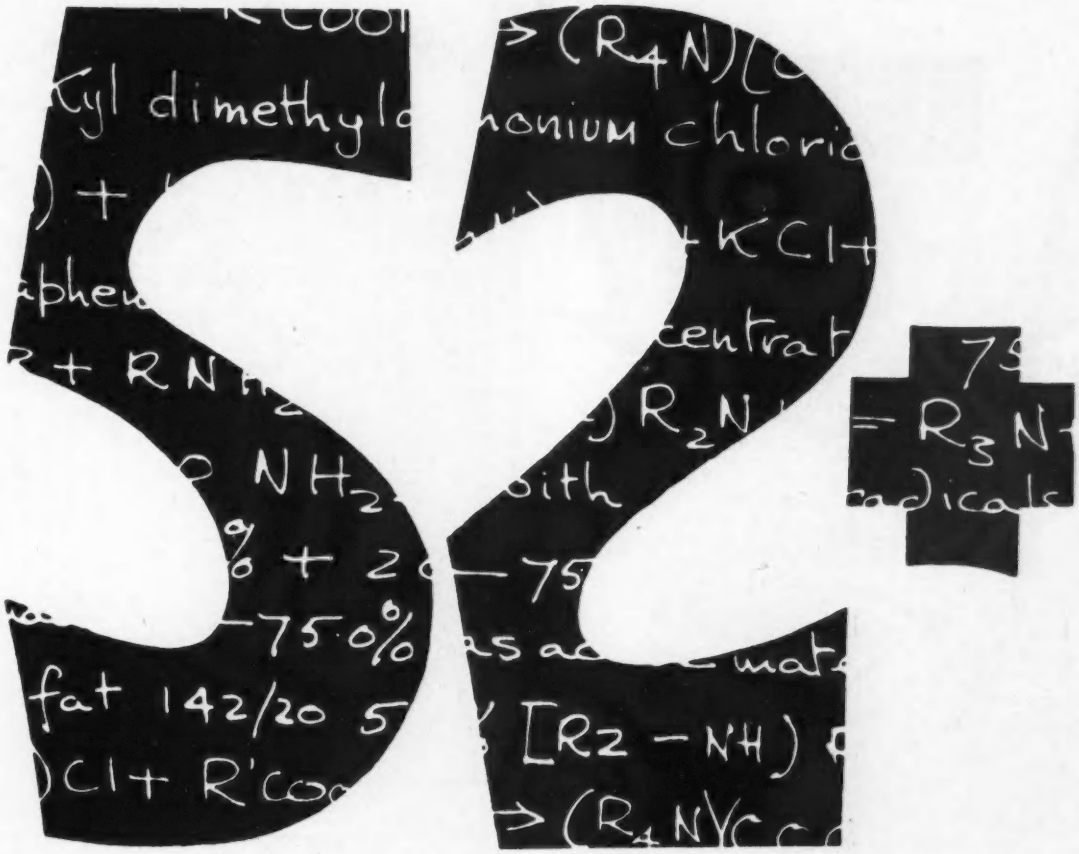
LONDON OFFICE: BRETTENHAM HOUSE, LANCASTER PLACE, STRAND, W.C.2

SE. 41



Since production of Armour Chemicals began in the United Kingdom in the Spring of 1956, new Armour Chemicals have come from the plant at the rate of one every 2½ weeks. By the Autumn of 1958 there were 52 chemicals in regular production — and more are constantly being added. The latest newcomers are the ETHOMEENS, which are tertiary amines with a nonionic structure. Others are such cationic products as aliphatic amines (ARMEENS), diamines (DUOMEENS), their water soluble acetate salts (ARMACS, DUOMACS), and quaternaries (ARQUADS), and the amphoteric ARMEEN Z series.

There is virtually no industry in which these surface-active substances are not in use, or in which they have not a potential use. No matter what your interest, it will pay you to study our informative booklets, available to you free on request.

ARMOUR CHEMICAL INDUSTRIES LTD

4 CHISWELL STREET, FINSBURY SQUARE, LONDON, E.C.1. METROPOLITAN 0031

VOL. 81 No. 2075
APRIL 18 1959

Telephone: FLEet Street 3212 (26 lines)
Telegrams: Allangas - Fleet - London

CHEMICAL AGE

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IN THIS ISSUE

Annual subscription is: home, 52s 6d, overseas, 60s, single copies 1s 6d (by post 1s 9d)

SELLING RAW MATERIALS

THE more important points which should be in mind when chemical manufacturers set out to sell raw materials were dealt with by Sir Walter Worboys, commercial director of Imperial Chemical Industries Ltd., in an address to the Advertising Association's 26th Annual Conference (see CHEMICAL AGE, 11 April, p. 616). Before talking about selling of raw materials, however, Sir Walter defined what he meant by 'raw material'.

In his view this meant a material which entered into a manufacturing process and emerged in a different physical or chemical condition. He instanced, for example, sulphur as a raw material for making sulphuric acid, which in turn is a raw material for making superphosphate. For raw materials which were themselves products of secondary industry the position was not so simple. It will be recalled that definition of what was a chemical raw material gave rise to difficulties during the polymer tribunal hearing last November (CHEMICAL AGE, 29 November 1958, p. 902).

What are the more particular factors to be considered in selling raw materials? Sir Walter listed: Price, quality, service, technical service and presentation, in that order. All will be agreed that "a cardinal requirement for selling is that 'the price must be right.'" If the product is a unique one by virtue of patent protection, etc., then "price must be such as to encourage the customer to buy more." If the product is in direct competition with another then "the cut and thrust of the market" determines the price. In comparing prices, however, a customer should take into account such factors as quality, continuity of supplies, packing and technical service—"factors that can determine the placing of the order—can indeed on occasion obtain a premium over the price offered by the competitor."

A minor factor in fixing selling prices should be manufacturing costs, reports Sir Walter, although the relationship between costs and selling price determines the success of a business and at the same time influences the inventiveness and vigour of an industrial team. Britain's manufacturing costs, he states, have received less attention than they should have as British industry has enjoyed a seller's market for 20 years. Now, we have returned to the conditions of the early- and mid-thirties. Installed capacity is often greater than current demand, and there are, therefore, strongly competitive conditions existing both in our home and overseas markets. These conditions, Sir Walter feels, are likely to continue.

Manufacturing costs have unfortunately been allowed to rise. To hold our own "in the 'lean' years that lie ahead, we must give more and more attention to manufacturing costs." Sir Walter says that in British industry, cost consciousness, both among staff and among workers, is not as acute as it is in the U.S. or Germany, for example. Also our commercial exploitation and our selling, are, he believes, not as good and not as forceful as they should be properly to balance the factors of good research, good technology and good personnel policies. "We underestimate the importance in our national life of the skills which are called for in selling the output of our factories."

Sir Walter points to the seller's market of the last 20 years as having been a great disadvantage, so that young executives in British industry have never

known strongly competitive conditions until 18 months ago. In this respect it is of interest to note the suggestions and recommendations for the improvement of Britain's export performance put forward in a 'Report of Export Trade Facilities', the report of an independent working party set up by the Federation of British Industries and chaired by Sir Cecil Weir (see p. 653).

Stress was laid by Sir Walter on the importance of raw materials in customers' works costs. "If, by reducing prices, we can increase our customer's offtake because he is enabled to sell more of his end products, that is to our advantage—provided always that our costs are such as to give us satisfactory profit margins at the lower selling prices." He also stressed quality. In the chemical field, fortunately quality standards, both chemical and physical, can be defined fairly readily for a great many products. For others, such as the newer thermoplastics and synthetic fibres, quality factors are less tangible. In these cases because of the importance to the customer, quality becomes a very important selling factor. Therefore it is considered well worth while to master the problems involved in producing a product of high and consistent quality.

Price and quality will not effect sales if delivery or continuity of supplies is bad. Therefore in selling raw materials, we should put great emphasis on continuity of supplies and the keeping of delivery promises. The raw material seller's objective is not to make a single sale but to make continuing sales and he must be concerned with increasing his goodwill with the customer.

During the past few years much has been heard about technical services, and more recently about technical service and development laboratories. Such services are important not only because they help sales by showing how products can be used by customers in their own industries, but because they assist in working out new methods for manipulation and new uses of products.

Both Sir Walter and the 'Report of Export Trade Facilities' point out that sales of products depend to a large and increasing extent on packaging. "Packages should be thought of in terms of function, aesthetics and economies." Sir Walter includes presentation of good technical literature.

In achievement of maximum effect, good salesmanship is important, while publicity, in its various forms, "can be a powerful aid in presenting a product to potential customers, and in setting the climate in which the salesmen work." In advertising raw materials, Sir Walter suggests that as the customers for any given new material are few in number, the object of a company's advertising policy should be, first, to keep the name of the company before them; and second, to keep knowledge of the products and their properties before the technical and commercial staff of customers. This is done by advertising in the trade and technical journals (see CHEMICAL AGE leader last week, p. 609 and p. 653 this issue).

In selling overseas, quality, delivery promises and continuity of supplies become even more important, and technical service, while not so easy to maintain, is of great importance. Adequate literature in the language of the consuming country is stressed both by Sir Walter and the export trade facilities survey.

Like S. P. Chambers (CHEMICAL AGE, 21 March, p. 497), Sir Walter points out that the more highly developed countries will offer better markets for our raw materials than countries with little secondary interest, but at the same time there will be competition from other industrialised countries. Price is therefore all important and underlines the need for acute consciousness in U.K. manufacturing plants. Also, if the U.K. is to continue as a major export nation, new products and new grades of existing products must be developed. Good research and development and speedy technological and commercial development are therefore a vital necessity.

POLAND'S CHEMICAL INDUSTRY

EXCLUSIVE to CHEMICAL AGE is the report on Poland's chemical industry (see p. 655). It gives for the first time since 1939, an authoritative outline of that country's industry and indicates targets set for the coming years. Development of the industry was started in 1946. Then all efforts were concentrated on increasing production of sulphuric acid, caustic soda and nitrogenous and phosphatic fertilisers. Somewhat later production of synthetic chemical materials was started on a large scale. Today this production meets 25% of the total demand.

Scientific research is carried out in 80 institutes under control of the Polish Science Academy. Recent studies have concerned semi-conductors and nuclear physics and the production of germanium and silicon crystals. Polish scientific advisers, in fact, consider that Poland has passed the most difficult period of technical development. With production forging steadily ahead, with more competent technicians and scientists created by the country's new educational system available, and with utilisation of her scientific discoveries, technical progress in Poland is considered to have very bright prospects.

A particularly favourable factor for the country is that most of the basic raw materials required by the Polish chemical industry are available from home sources and are in ample supply. There are rich deposits of common salt guaranteeing almost unlimited supplies of soda ash, chlorine, caustic soda, sodium, etc. Limestone deposits occur over large areas, to provide the chemical industry with carbide, soda and fertilisers. Sulphur has recently been found in important quantities and has ensured the future intensive development of the sulphuric acid industry. Coal is available in abundance and crude oil and natural gas are being increasingly used in the chemical industry.

Poland's economic plan for 1959-65 is intended to be a period of concentrated build up of the 'newer' chemical industries, such as that of organic compounds—fibres, rubbers and plastics. The country also aims to expand the output of basic inorganic chemicals such as sulphuric acid and soda, as well as pharmaceuticals and dyestuffs. Present aims are, in fact, achievement of as comprehensive a chemical industry as possible and the raising of the general level of chemical output. This will allow Poland greater trading possibilities and, her Government hopes, a better export potential, particularly for processed chemicals.

What interest has Britain in Poland? Our exports to Poland to date have been comparatively small but in recent months the U.K. chemical industry has been showing, in its search for new and expanding markets for its goods, an increasing interest in trade with that country. The indications are that British exports to Poland could increase rapidly very shortly and that that country will prove an important market for our chemical products and plants and equipment. U.K. trade with Poland, in fact, has the Board of Trade's blessing.

Before the Second World War, the U.K. imported some £10 million worth of Polish goods and exported to Poland goods worth about £5¼ million a year. Last year U.K. imports totalled £26 million and exports exceeded £11 million.

Trading operations seem somewhat complicated because of quota arrangements which include chemicals and pharmaceuticals. Another complication is financing of Poland's imports needs. British chemical exporters, however, are cognisant of the opportunities awaiting them in Poland and see the country as a gradually expanding market, if her capacity for earning sterling and other currencies does not remain a limiting factor.

CONSORTIUM IDEA COULD HELP BOOST BRITISH EXPORTS

F.B.I. Report Says It Should be Extended

FACILITIES available for assisting firms in the development of their export trade with a view to identifying any gaps in education and training facilities for sales and other staff, have been surveyed by a working party, whose chairman is Sir Cecil Weir, set up last year by the Federation of British Industries with the approval of the Board of Trade. The 'Report of Export Trade Facilities,' published this week is available from F.B.I. Print and Publications, 21 Tothill Street, S.W.1 (price 5s post free, including air mail).

The report, which is now being studied by the Board of Trade and by the F.B.I. to see what action is required by them, surveys the export field—training of salesmen, export market investigations, design, packaging, advertising, trade fairs and public relations.

In recent years, the report shows the U.K. has obtained a smaller share percentage rise in world export of manufactured goods: 1938, 22.1%; 1957, 18.1%. There is now growing competition from other industrial countries such as the U.S., W. Germany and Japan, and one certain way to increase the volume of profitable exports is to increase the number of competent exporters.

European Market

A large number of small firms could export more than they have been doing, and with the growth of the Common Market and the possible development of a Free Trade Area, they may have to regard Europe as an extension of their home market, the report states. At the same time "some of the large firms might play a greater part in organising facilities overseas not only for themselves but for groups of exporters". The consortium idea, the report points out, has already developed successfully in the nuclear field, the construction of steel plant, etc., and it could well be extended to other appropriate industries. It is suggested that consideration should be given to the establishment of export councils for the European and other non-dollar markets. Much attention is paid in the report to the working party's findings with regard to methods by which the training and education of sales personnel might be improved. In particular the importance of a knowledge of foreign languages is stressed.

More attention should be paid to export market investigation, the report recommends, and exporters should make better use of the available facilities. The working party's view is that there exists in this country readily available information to give most manufacturers of consumer goods and many manufacturers of industrial goods, a fair picture of individual overseas markets. They are very satisfied, in general, by the services provided by the Government to private industry, in this field, but "are concerned by the indications that these services (H.M. Commercial Representation Overseas and Commercial Intelligence) are still being insufficiently used by British exporters despite wide publicity. It is felt that a comprehensive guide to statistical sources might be published by the Board of Trade on the lines of the one published in Germany.

More of the smaller companies should appoint suitable persons to take charge of export sales-planning, including interpretation of market information. Also more frequent interchange of small fact-finding trade missions between this country and others should be promoted by the national organisations and trade associations in association with the Board of Trade.

In Parliament

No Decision Yet on Future Home for Government Chemist's Department

The Minister of Works was asked on Monday why, in view of the condemnation by the Linstead Committee of the proposal to house the Government Chemist's department in Cornwall House, his staffs were still spending much time and labour on plans for carrying out this conversion. Mr. Hugh Molson, the Minister, said that discussions about the future accommodation of the department were still going on and a final decision had yet to be taken.

No Regulations on Disposal of Radioactive Wastes

At present there are no regulations governing the disposal of radioactive waste from industrial establishments, Mr. J. Nixon Browne, Joint Under-Secretary of State for Scotland, stated in reply to a question in the Commons on 7 April.

He said an expert panel had reported on the best way to control the handling and disposal of radioactive waste. The government would shortly be consulting the local authority associations and others interested about proposals for legislation, and the issue of a White Paper would be considered.

In the meantime officials would continue to give advice, and the Atomic Energy Commission were willing to assist in the disposal of radioactive waste which could not safely be disposed of locally.

Determination of Fertiliser Compounds

Asked what proposals he had for requiring producers to state the proportion of aldrin, dieldrin and boron when contained in compound fertilisers, Mr. John Hare, Minister of Agriculture, Fisheries and Food, last week said that investigations were in hand into the possibility of devising satisfactory methods of analysis for the determination of those substances. Further consideration would be given to the matter when that work was completed.

Tar Distillation Plant Fire

A fire starting in a fuel tank of the tar-cooling and distillation plant at Scottish Tar Distillers, Camelon, Falkirk, on 8 April spread to a pitch-mixing plant and waste gases condenser.

Considerable damage was done, but action by a works fire-fighting squad kept the fire in check till fire brigades arrived.

At the S.C.I. Manchester Annual Meeting

At the recent annual meeting of the Manchester section, Society of Chemical Industry, l. to r.: Dr. M. G. T. Burrows, hon. secretary (Murgatroyd's Salt and Chemical Co. Ltd.), Dr. F. P. Stainthorp (Manchester College of Science and Technology), Dr. S. Coffey, new section chairman (I.C.I. Dyestuffs Division); R. Winfield, hon. assistant secretary (Clayton Aniline Co. Ltd.)

★ Two distinguished brothers are to edit what must be the most comprehensive work on analytical chemistry yet published. They are Professor Cecil L. Wilson, of Queen's University, Belfast, holder of Britain's first chair in analytical chemistry, and David W. Wilson, senior lecturer of the Sir John Cass Chemistry Department.

Scope of the work entitled *Comprehensive Analytical Chemistry* can be seen from the fact that the first volume—Classical Analysis—has become so large that it is now to be divided into three parts totalling over 2,000 pages. The work was originally to have been edited by Cecil Wilson alone, but the aid of his brother was enlisted to complete all the parts of the first volume between May and December this year. The book is to be published by Elsevier and distributed in this country by D. Van Nostrand, 358 Kensington High Street, W.14.

★ A NEW lactic acid purification process, believed to be the first to make use of continuous solvent extraction, has just been announced by Bowmans Chemicals Ltd. It is said to be a good example of large-scale use of glassware and to feature regenerative carbon purification and a high degree of automatic control. I am told that the plant will produce the purest grade of lactic acid yet available commercially.

Another major development by this progressive Widnes company is a new type of calcium lactate as an additive to animal feed. It is said to contain a higher lactate content and much finer texture than previously. Long-term trials have shown that the material will give increased egg production with no increase of food intake.

★ THAT in countries such as Britain, completely unable to support themselves out of their own natural resources, governments must play a considerable part in industrial affairs was a controversial point made by Sir Hugh Beaver, president, in his address at the recent annual meeting of the Federation of British Industries. Sir Hugh declared there must to a large degree be overall planning; it was not enough for industry to be efficient; it must be an efficient and effective machine as a whole.

In his view everything pointed to and required a close knit alliance between our free-enterprise competitive industry and the Government. Industry must accept that as a joint exercise; there was, he added, nothing now to be said for the old Victorian freedom of action, even if it were still practicable. As a corollary to that, the first and overriding consideration of all British governments must be to create the conditions in which industry could be efficient and competitive.

He spoke of Britain's vulnerable dependence on exports. He was convinced that it would be unwise and unsafe for British industry to sit back and think that in a few years the position would be easier. Few would deny that such a policy would be disastrous. We must in no way relax and meanwhile industry must do what it can to minimise the adverse effects of the Common Market as it increasingly gets into motion.

★ PUBLICITY given to new Board of Trade regulations is likely to lead to an increase in the chemical treatment of textiles to make them flameproof.

The regulations make it an offence to describe as non-inflammable any fabric which does not conform to four new British Standards. They do not enforce treatment of fabrics—as some members of a Parliamentary committee on the subject would have liked them to do—but they are likely to make the public more aware of the importance of buying flameproof materials, particularly for children's clothes. Women's organisations are campaigning to convince mothers that the small extra cost for treated fabrics is a valuable insurance.

To satisfy the performance tests fabrics must remain flameproof after washing. There are separate standards for industrial clothing. The regulations come into force on 11 May.

★ IN VIEW of recent comments in this journal on secrecy in the chemical industry, readers may be interested to learn that CHEMICAL AGE usually receives in any one week more material from the American Chemical Society than from either the Chemical Society or the Society of Chemical Industry in a whole year. In fact, the A.C.S. has issued summaries of each of the more than 1,000 papers presented at its annual meeting; full copies of the papers are freely available. In addition special news releases have been issued in respect of the more interesting papers.

Few learned or professional societies in this country can afford such lavish press facilities, but it is ironical that British journals should receive such service only from across the Atlantic, when their main task must be to pinpoint the work of British scientists and engineers. Most British societies issue preprints of whole papers to the technical press on the understanding that no more than a limited proportion is published. Neither the C.S. nor the S.C.I. do this.

In the case of the latter, authors of papers are expressly forbidden to give their papers to the press, the copyright being vested in the society. The press as such cannot even obtain copies of papers to summarise them, although the regulations do not explicitly debar this. CHEMICAL AGE has frequently reported both C.S. and S.C.I. meetings, without involving authors in any infringement of the respective regulations, but through normal journalistic enterprise. I can assure readers that this policy will continue.

★ MORE details have reached me of Laporte's high test hydrogen peroxide in the recent firings of the Black Knight ballistic missile. The rocket's engines burn high grade paraffin with the peroxide, silver-plated bronze plates acting as the catalyst for the H.T.P. which is converted to steam and oxygen. The steam drives various pumps and boosters in the rocket and the oxygen is needed for the burning of the paraffin.

H.T.P. was used in the Napier Scorpion rocket motor that made possible the record-breaking climb to 70,310 ft. by a Canberra B2 in 1957; this motor was later incorporated in the English Electric P1B fighter, giving it a phenomenal rate of climb. It was the ability of H.T.P. motors to operate in the rarified air of high altitudes without loss of performance that led to their use not only for assisted take-off but for boosting high altitude performances.

★ Two striking new Chemico booklets are now available from Chemical Construction (G.B.) Ltd. Bulletin 259 features the new London offices and briefly lists the services provided. It is stated that 1,200 projects have been completed throughout the world.

For ammonia, some 60 Chemico plants, ranging from 5 to 450 tons a day, account for about 25% of the world's total output; nearly 200 sulphuric acid plants—from 10 to 600 tons-day capacity—are said to account for some 30% of the world's capacity from contact plants. Chemico urea plants in production or now building have a total capacity of more than 1,000 tons-day. When current projects are completed, the Chemico process will "account for a larger proportion of the world's urea capacity than any other commercial process."

The group's ammonium nitrate plants produce more than 1.5 million tons a year; production from Chemico ammonium sulphate plants is said to total nearly 3 million tons a year.

Bulletin 159 gives greater details of the processes available. I think it a pity that Chemico literature produced in this country now uses American spellings—'sulfuric acid,' 'ammonium sulfate,' etc. Doubtless it is a rational decision from the New York parent, but one that should be reversed so far as this country is concerned.

Alembic

Postwar Expansion of Poland's Chemical Industry

17% Output Increase in 1958 Will Be Repeated This Year

This article, exclusive to 'Chemical Age', is the first authoritative account to be published of the development of the Polish chemical industry since the war. It contains details of past and present outputs of a wide range of chemicals and shows by how much current production rates are to be increased

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THE chemical industry in postwar Poland occupies sixth place after the food, machinery, coal, natural gas and petroleum, mining and primary metals and textile industries. With production valued at 22.150 million zloty ($735 million) in 1958, an increase of 17% over 1957, it accounted for more than 6% of the sales value of the whole of Polish industry. For 1959 an output valued at $825 million, and for 1960, $910 million is planned.

With a planned gain for 1958 of 15% over 1957, and 17% actually achieved, a similar performance is expected in 1959 despite the fact that an increase of only 13% has been planned. The rapid growth, which has characterised chemical industries in several countries and which has exceeded the average growth of industry as a whole (the corresponding figures for the whole of Polish industry were in 1958 10%, whereas for 1959, 7.5% is planned) has been secured by the expansion of existing and construction of new capacities. This trend will be maintained and plans are well advanced for more than doubling by 1965 the output of the chemical industry as it will stand in 1960.

Progress made after the war can be judged from the figures given below for the output of the most important chemical commodities for the years 1938, 1949, 1955, 1958 as well as from the figures planned for 1959, 1960 and 1965. The index of production of chemicals, based on 1949=100, stood at 251 in 1955; 380 in 1958; and the index planned for 1960 is 490 and for 1965, 950.

Output Still Low

Output in 1958, calculated per head of population as judged by West European standards, is still low, with the exception of a few basic chemicals, such as soda ash (13 kg.), ammonia (9.8 kg.), carbide (8.7 kg.). The development of petrochemicals, synthetic detergents, plastics (0.9 kg.), and synthetic fibres (0.07 kg.) is far from the level which could satisfy the quickly growing demand, mainly because of past difficulties in securing the only reasonably economical raw materials—natural gas and petroleum distillates.

To get the performance of the Polish chemical industry in perspective, the 1958 output should be examined against the background of the vast war damage which reduced the already very low level of prewar production capacities in Central Poland to less than 30% in 1945. Out of three plants which produced in 1942 a total of 160 tons of ammonia a day, the largest Tarnow factory (100 tons of ammonia per day) was dismantled by the Germans and the equipment taken to Pisterietz. New factories built during the war by the Germans in the Polish Western provinces in Osweicim, Kedzierzyn and Blachownia were in 1945 dismantled in accordance with the Potsdam Agreement and were brought into operation again only after several years of reconstruction.

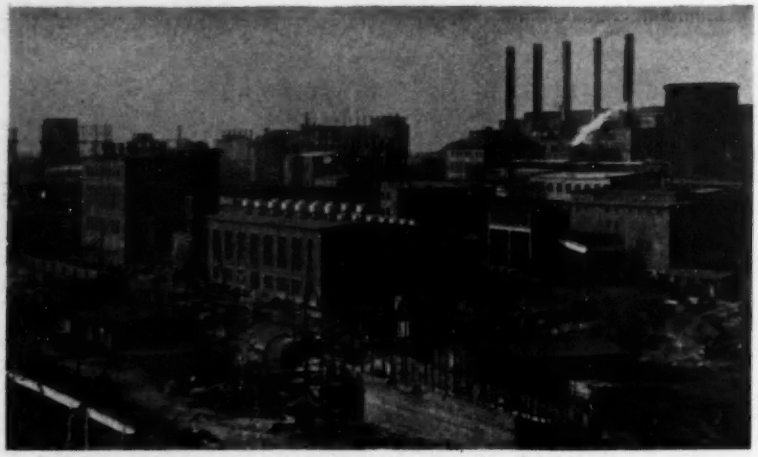
Growth of the inorganics and fertiliser industry. Against these heavy odds, the capacities of the two prewar soda ash factories in Cracow and Inowroclaw were expanded by more than 200%; a third factory, equipment for which was imported from the Soviet Union, was built in Janikow, with a rated capacity of 600 tons of soda ash per day. Existing capacities for the production of sulphuric acid in several factories have been expanded, the Szczecin factory reconstructed, and a plant with a capacity of 300 tons per day erected in Wizow was based on the anhydride process.

Phosphoric Fertiliser

In Cracow, a factory for production of a basic phosphoric fertiliser of the Rhenania-phosphate type with a capacity of 700 tons per day was erected and put into operation for the production of dicalcium phosphate utilising a Polish process. In Tarnow a plant for the production of dicalcium phosphate utilising a Polish process that was dismantled in 1943 by the Germans, was rebuilt and put into operation.

To put an end to an unjustified and costly import of wheat and to boost the efficiency of Poland's agricultural production, it was above all necessary to expand production of the nitrogenous fertilisers. Total capacities that were equivalent to 160 tons of ammonia per day in 1942 have been increased in Tarnow to 360 tons per day, in Chorzow to 140 tons per day and new daily capacities of 600 tons built and put into operation in Kedzierzyn.

At present only 180 tons of ammonia a day are being produced from hydrogen from gas and coke oven gas, the rest of the ammonia being based on the gasification of coke, but a further expansion of ammonia production by 1962 will utilise natural gas and coke-oven gas exclusively. This expansion will require the elimination of bottlenecks in existing plants. Nitrogenous fertilisers include ammonium nitrate with calcium carbonate with 20% N and 25% N, ammonium nitrate, calcium nitrate, calcium cyanamide, and ammonium sulphate, and from 1958 urea, which is being produced in Kedzierzyn in a plant with a rated capacity of 60 tons a day.



General view of the Oswiecim synthetic rubber plant

The noteworthy fact about the expansion of nitrogenous fertiliser facilities is that it was based mostly on Polish design. High pressure equipment, compressors and few other plant items not fabricated in Poland have been imported from Czechoslovakia, the Soviet Union and East Germany.

A substantial expansion has taken place in chlorine manufacture. Three new plants in Jaworzno, Oswiecim, and Rokita are in operation all using the mercury electrolytic cells of the J.G. type imported from East Germany. A fourth plant of the same type now under construction at Tarnow will go into operation by the end of 1960.

Expansion Programme for Organic Products and Intermediates

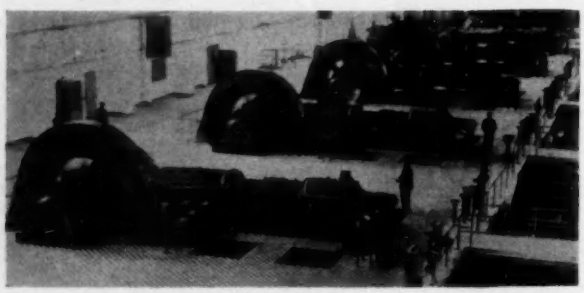
ALL organic products in the Polish chemical industry are still manufactured only from coal. It is necessary to bear in mind, however, that the coal mines and coke oven plants in Upper Silesia were two of the few industries to escape destruction during the war and that the domestic price of coal and coke was only recently increased to a level equivalent to West European prices. Also it was only in 1958 that new fields of natural gas (over 90% methane) were discovered and drilled in Lubaczow and in Dabrowa. Extension of pipelines is under way with the principal aim to supply the Tarnow works with methane where from 1961 on it will be utilised for acetylene and synthesis gas manufacture.

The basic raw material for organic synthesis in Poland is still carbide. The prewar Chorzow carbide ovens are gradually being replaced by bigger units. New capacities have been built in Bytom and Oswiecim and still more ovens are to be added.

Oswiecim carbide acetylene in 1958 was used for the manufacture of solvents (trichloroethylene, ethyl acetate, butyl acetate, acetone), and of thermoplastics (p.v.c., polystyrene and methylmethacrylate). The p.v.c. (emulsion type) plant of Polish design with rated capacity of 6,000 tons a year is being expanded to 14,000 tons.

Polystyrene manufacture, started only in 1958, is to be developed rapidly. Construction of a plant with a rated capacity of 4,000 tons a year supplied by Petrocarbon Developments Ltd., London, is under way. Both polystyrene plants will at the beginning of their operations polymerise styrene derived from acetylene hydrogenated catalytically to ethylene.

The bulk of acetylene in Oswiecim will go into the manufacture of styrene-butadiene regular and cold rubber. A plant of Russian design imported from the Soviet Union with a rated capacity of 36,000 tons per annum will start its operation this year. For the synthesis of rubber, the Lebiediew process will be employed, which entails acetaldehyde being hydrogenated to ethanol that on catalytic dehydration-dehydrogenation will yield butadiene. Cost of production of the styrene-butadiene rubber by this four-stage process in Oswiecim will of course be appreciably higher than the cost of production of GR-S rubber starting from petrochemical butadiene because the carbide acetylene costs about $225 per ton.



Ammonia synthesis compressors in Kedzierzyn

To expand production of rubber from 36,000 tons per annum to 45,000 tons, two possibilities have been taken into account—one of substituting carbide acetylene with acetylene from the partial oxidation of methane and the more interesting one of supplying the Oswiecim plant with butadiene from *n*-butane.

The acetaldehyde capacities in Oswiecim serve not only the synthetic rubber plant but acetaldehyde is also oxidised to acetic acid and will also be used for ethylhexanol production. Construction of a plant with a capacity of 8,000 tons per annum utilising the 'Usines de Melle' process is under way. Ethylhexanol and butanol from the plant will be processed to phthalates. In another plant of a Polish design, acetylene is processed to a mixture of acetic acid and acetic anhydride.

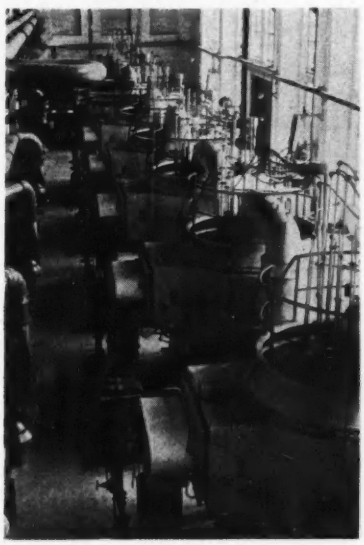
Another rich source of organic chemicals is crude benzole, and coal tar distillates recovered as by-products from the high temperature carbonisation of bituminous coal (13.5 million tons in 1958). The refined aromatic hydrocarbons and oil fractions from two refineries in Upper Silesia (Hajduki and Blachownia) are processed to give a whole range of intermediates, of which those manufactured in substantial quantities are synthetic phenol (sulphonation and chlorination processes), phthalic anhydride from pressed naphthalene catalytically oxidised by air, anthraquinone (from anthracene processed in a similar way), betanaphthol, aniline, chlorinated derivatives of benzene, cyclic amines, nitro-derivatives, cyclic acids, etc.

Production of coal tar dyes and organic pigments in Zgierz, Pabianice and Bydgoszcz includes most popular groups, i.e. azo dyes, aniline dyes, anthraquinone vat dyes, sulphur colours, naphthalenes, and from 1958 a new original class of dyes, Pologene, developed directly on the fibre as a result of Polish research.

Production of textile chemicals includes for the time being those for which there is a high demand—the urea and melamine derivatives, polyvinyl acetate resins, and aromatic chemicals. The production of synthetic tanning agents in 1958 included several manufactured in Rokita in a quantity of 2,480 tons. In 1958, the following agricultural chemicals were manufactured in Jaworzno and Rokita: DDT (1,900 tons), gammexane (12 tons), 2,4-D (38 tons), MCPA, pentachlorophenol.

In 1958, production of dichloronaphthaquinone and of dimethyldithiocarbamate of zinc was begun as a result of Polish research work. About 180 pharmaceutical chemicals were manufactured in 1958. Antibiotics production for human pur-

poses included penicillin (9,888 million units), oxytetracycline (0.6 tons), chlorocyclin, chloramphenicol (3.5 tons), salicylics (510 tons), sulpha drugs (100 tons), barbiturates (luminal, veronal, etc., 20 tons), hormones (52 kg.), vitamins PP, C (48 tons), B6, pyrazolone (amidopyrine 100 tons), antituberculosic drugs (PAS Natrium), insulins, etc. There are eight factories producing pharmaceuticals at Cracow, Tarchomni, Kutno, Pabianice, Grodzisk, Jelenia Gora, Warsaw. Photochemicals have been produced in two factories in Warsaw and Bydgoszcz.



Ethylbenzene to styrene converters in Oswiecim

In the production of man-made fibres, viscose filament and viscose staple fibre are supplied in bulk, being produced in Tomaszow, Chodakow, Lodz, Szczecin, Wroclaw, Jelenia Gora with the casein fibre still occupying second place and caprolactam fibre (Gorzow), third place. For 1959, a substantial increase of caprolactam fibre production is planned.

Manufacture on a larger scale of p.v.c., polystyrene, caprolactam, urea and melamine which was started in Poland only in 1957 and 1958 has created favourable conditions for the plastics industry. Small quantities of polyester and epoxy resins were also fabricated in 1958 for experimental purposes.

Main end uses for the plastics and resins are the electrochemical and wire coating industry, radio, television, telephone, domestic equipment manufacture, transportation equipment (motor cars, railway carriages, ship building), building industry (floor coverings, laminates, wall tiles, insulation, piping, plumbing fixtures, etc.), furniture manufacture, packaging, artificial leather, toys, toilet articles, paint and varnish industry.

The rubber processing industry has its main outlets in tyres, rubber footwear, floor covering, sports goods and technical articles, such as conveyor and transmission belts, hoses, etc. The dependence of this industry on imported natural and synthetic rubber will from 1960 gradually lessen since the Oswiecim works will cover a substantial proportion of the present demand for synthetic rubber.

Employment. The whole of Poland's chemical production is organised (in some respects not unlike the larger private chemical companies in the U.S. and West Europe) as an integrated concern with 10 operating divisions responsible for the manufacture, sales, research and development maintenance and construction to the head office, which has the status of a Ministry within the nationalised heavy industry. The industry employed 158,737 in 1958 against a figure of 143,527 in 1955.

Sales output per employee in 1958 was 140,000 zloty, equivalent to $4,650, a low figure in comparison with the corresponding ones for the West European chemical industries. The great speed with which postwar chemical production has been developed in Poland, combined with an acute shortage of highly trained supervisory and operational personnel, led to delays in full utilisation of the erected capacities, which are in some cases already below the optimum economical capacities. A number of processes starting from rather expensive raw materials, such as coke, and not easily adaptable to automation which has only recently started to take root, as well as the inadequate part played by the finishing operations which greatly added to the value of products, all played their part in keeping output per employee low.

(To be concluded)

Past, Present and Planned Production in Poland

PRODUCTION OF CHEMICALS IN THOUSAND METRIC TONS

	1938	1949	1955	1958	1959	1960	1965
Brimstone	—	—	—	1.1	17.5	30	350
Common salt	385	450	1,235	1,667	1,700	1,850	2,250
Sulphuric acid, 100%	160	275.8	450	572	600	680	1,150
Aluminium sulphate	—	4.3	14	21.4	22.6	22	36
Superphosphate & other phosphoric fertilisers, P_2O_5	31	73.6	129.9	153.9	180	205	350
Sodium dichromate	—	—	4.0	5.5	5.7	6.9	12
Soda ash, 98%	87	122.5	219	379	455	520	620
Soda, caustic, 96%	28.2	56.4	101.6	150.8	158	162	250
Chlorine	4.2	4.9	8	37.2	45.2	50	130
Hydrochloric acid, 100%	2.9	6.7	11.5	16.2	18.2	19.8	26.7
Ammonia, synthetic	38.5	48.8	166.5	281	321	350	600
Nitrogenous fertilisers, N	42.6	73.9	154.1	227.5	237	290	480
Urea	—	—	—	1	5	15	60
Carbide as 75%	68.8	154	211	251	263	315	500
Calcium cyanamide	84.5	169	166	162	170	160	170
Methanol synth.	0.1	0.45	93	179	18	18	60
Octanol	—	—	—	—	—	0.1	8
Formaldehyde, 100%	0.26	0.7	4.9	8.3	—	10.3	29.7
Ethylene oxide	—	—	—	0.1	0.1	0.1	5
Primary products of Fischer-Tropsch synth.	0	0.5	14	15	15	15	15
Acetic acid, synthetic	0	1.0	3.2	9.4	8.5	11	20
Trichloroethylene	0.1	0.77	2.8	5.0	5.2	7.0	8.0
Acetone	—	—	0.7	1.0	1.27	1.4	10
Synthetic & natural phenol	—	—	3.5	7.7	12.1	17	35
Phthalic anhydride	—	—	0.3	2.8	2.8	3	15
Naphthalene	—	—	—	20	20	27	39
Benzene	—	—	—	30.5	43.5	46	100
Chlorobenzene	—	—	—	9.1	10	11	14
Toluene	—	—	—	14.2	15.1	17	21
Organic dyes	2	3.7	6.2	7.7	8.1	8.6	12
DDT	—	0.035	1.49	1.9	2.1	2.4	2.4
Gammexane	—	—	—	0.012	0.018	0.03	0.170
2,4-D	—	—	0.02	0.038	0.130	0.5	1.0
Tanning chemicals	—	0.69	2.14	2.4	3.2	3.2	5.3
Carbon black	—	3.5	8.1	10.8	14	17	25
Carbon and graphite electrodes, etc.	—	11.4	26.2	27.4	28.7	31	45
Plastics and resins	0.7	1.76	9.23	32.3	36.6	55.7	150-175
Polyvinyl chloride	—	—	—	4.2	6.7	14	40-50
Polystyrene	—	—	—	0.3	2.3	4	12
Phenolics (powder resins)	—	0.79	6.4	11.4	13.3	18	26
Urea & melamine resins & powder	—	—	1.5	5.1	7.2	12.5	34
Alkyds	—	0.08	0.97	1.6	1.8	2.5	7
Cellulosics	—	0.613	11.5	1.82	2.5	3.0	8.4
Casein resins	—	0.178	0.63	0.69	0.72	0.75	0.75
Paints & varnishes	—	10.6	48.3	59.4	68	73.6	130
Lithopone, 30%	—	4.56	6.05	5.7	8.2	9.3	14.5
Synthetic rubber (regular & cold styrene—butadiene)	—	—	—	—	1.6	20	45
Rubber products	—	20.3	66.2	99.8	105.4	107	150
Tyres	—	6.4	19.5	35.4	39.7	45.6	69
Viscose filament	6.2	9	15.4	18.3	19.4	21.5	31
Viscose staple fibre	—	14	35	42.2	42.5	49	50
Casein fibre	—	0.6	2.9	3.4	3.5	3.5	3.5
Caprolactam fibre	—	—	0.5	2.2	3.5	4.5	12
Synthetic detergents, 100%	—	—	—	3.5	3.5	8	17.5
Pharmaceuticals, '000 million zl.	—	—	705	1,384	1,657	1,940	3,500
Salicylics	—	0.07	0.38	0.5	0.5	0.7	1.1
Sulphonamides	—	0.009	0.166	0.37	0.44	0.45	0.5
Vitamin PP, tons	—	0.087	0.150	11.8	11.3	25.0	50.0
Vitamin B_1, tons	—	—	0.2	—	—	0.5	10.0
Vitamin C, tons	—	—	12.7	48.1	50.0	75.0	150.0
Vitamin B_6, tons	—	—	—	—	0.04	0.5	10.0
Antibiotics—							
Penicillin, million units	—	—	6,238	9,888	6,950	10,000	15,000
Chloramphenicol, tons	—	—	1.19	3.56	4.7	5.0	7.0
Oxytetracycline, tons	—	—	—	0.66	3.89	5.6	15.0
Pyrazolone, tons	—	—	26.4	117.79	135.7	182	220
Barbiturates, tons	—	—	13.4	20.9	23.5	25	40
Insulin, million units	—	—	21.5	163	202.5	300	600
Hormones, kg.	—	—	17.2	52	52	80	120

B.A.S.F.'s ADIABATIC ABSORPTION PROCESS PROVIDES CHEMICALLY PURE HYDROCHLORIC ACID

WORKING on the principle of absorbing hydrogen chloride from hydrogenous gas compounds, the Ludwigshafen, West Germany, firm of Badische Anilin-und Soda-Fabrik AG (B.A.S.F.) some years ago developed their adiabatic absorption process for the production of hydrochloric acid (see CHEMICAL AGE, 4 October 1958, p. 565), B.A.S.F., which claims that this is the most efficient production method for the acid yet discovered, says that some 60 absorption plants—which are designed and erected in combination with the Meitingen, near Augsburg, concern Siemens-Plania Chemische Fabrik Griesheim—have already been sold to 11 foreign countries, including the U.K.

In the B.A.S.F. process gases containing hydrogen chloride are conducted through water in a reactor, the water flowing in countercurrent from the top of the reactor. The formation, by the reaction, of aqueous hydrochloric acid causes the generation of great heat, which in turn results in the evaporation of part of the water in the form of steam; the hydrochloric acid formed flows out at the bottom of the reactor. In other processes complicated devices are needed to remove the heat of reaction, while with the B.A.S.F. technique the steam itself effects its own removal. Although this escape of heat in the form of steam gives rise to certain problems with regard to corrosion and operational methods, these can be solved by the selection of suitable materials and designs for the apparatus.

Process Advantages

Main advantages of the process are said to be: safety and reliability of operation; no need for coolant water; recovery of organic chemicals used; simple and safe method of operation; adaptability to changing capacities; a small space requirement; concentration of all elements in one reaction tower; no danger of corrosion with completely enclosed apparatus; and extremely simple assembly of the plant used. The new process permits satisfactory production from heavily contaminated hydrogen-chloride content gases such as would by other processes be very difficult and very expensive. Even when waste gases contaminated with such strongly smelling substances as chlorophenol or chlorobenzene are used as starting material, the acid produced by the B.A.S.F. method is completely free from chlorine and organic components. And even from waste gases containing only small quantities of hydrogen chloride, a satisfactory commercial amount of hydrochloric acid may be obtained without any appreciable loss of hydrogen chloride gas in the absorption process.

The process permits the following:—

Production of a commercial quantity of pure hydrochloric acid (with a content of 30 to 38% HCl) from chlorine or chlorine-content gases and hydrogen.

Production of chemically pure hydrochloric acid (with a content of 38% HCl) from chlorine and hydrogen.

Production of hydrochloric acid from hydrogen chloride-content gases.

Production of a commercial quantity of pure hydrochloric acid from organic chlorination waste gases which contain hydrogen chloride, chlorine and organic impurities.

Production of pure hydrogen chloride (almost 100%) from dilute gases or hydrochloric acid.

Production of pure hydrogen chloride (almost 100%) from organic chlorination waste gases.

Production of hydrochloric acid free from sulphuric acid from sulphate oven gases.

Increasing the concentration of hydrogen chloride in gases from various processes (from 3 to 100% by volume of HCl).

Technical data for the plants are as follows: overall height approximately 14,000 mm.; external diameter 300 to 1,100 mm.; capacity up to 200 metric tons daily of concentrated hydrochloric acid, according to the composition of the gas used; automatic control if desired.

Chemical Aspects of Fire Protection

MODERN developments in the use of vaporising liquid extinguishing agents for fires involving flammable liquids such as petrol, and in particular the use of chlorobromomethane and the recently developed fluorobromomethanes were described by Dr. F. E. T. Kingman, of the D.S.I.R. Fire Research Station, when he addressed a recent meeting of the London Section, Royal Institute of Chemistry, at King's College, with Mr. F. C. Hymas in the chair. These agents functioned by their effect on the flammable limits of vapour/air mixtures and had their greatest effect on the upper flammable limit. It was found in practice that considerable economy in use could be attained by using a flat spray which directed liquid to the base of the flame.

The use of water sprays as fixed installations for fires in higher boiling liquids were described. For such installations there was an optimum size of water drop; thus with a kerosene fire, maximum efficiency was obtained with a drop size of 0.3-0.5 mm. With liquids of still higher boiling point, the aim must be to reduce the temperature below the flash point, and here again, water sprays appeared to be most effective. Thus fires in large transformers where burning oil was in contact with hot metal could be dealt with in this manner, provided that a forceful spray was used to ensure that the water reached the hot metal.

Among the special risks of industrial plants, reference was made to dusts. The ability of many solids in powder form to produce explosive mixtures with air has been known for many years and called for special care in plant design, including the provision of safety devices such as explosion vents. It was also essential to avoid accumulations of dust in work rooms.

A less well-known hazard was that associated with the spread of fire in quiescent layers of dust. A layer of sawdust would smoulder slowly at a rate of about 5 cm. per hour as long as the layer had a minimum thickness of 1 cm. The minimum thickness varied with the nature of the dust and might be as low as 3 m.m.; in all cases a slight draught reduced the minimum thickness required to propagate smouldering.

Gas explosions in ducts could be quenched by the incorporation of flame traps. The efficiency of a flame trap was governed by the size of the apertures in the trap and its thickness and the speed of the approaching flame. With gauze flame traps consisting of a number of layers there was little increase in efficiency beyond four layers, but with perforated metal plates and other types of trap which permitted a smooth gas flow, increased trap thickness was accompanied by higher efficiency provided that the size of the aperture was well below the quenching distance for the gas

Koreans Meet Beecham Penicillin Team

A PARTY of Koreans visited Beecham Research Laboratories, Betchworth, to meet some members of the team responsible for the isolation of 6-amino-penicillanic acid—the major research breakthrough which is expected to make possible the production of an unlimited range of effective new penicillins.

The party, which consists of a professor of political science, a headmistress, an editor and a tourist official, is visiting this country at the invitation of the Foreign Office.

Disinfectant Manufacturers' Officers

The following were elected officers and members of the executive committee of the British Disinfectant Manufacturers' Association at the annual general meeting: chairman, Mr. H. C. Askew (Reckitt and Sons Ltd.); vice-chairman, Mr. S. L. Waide; hon. treasurer, Mr. V. G. Gibbs.

Executive committee: Mr. R. G. Berchem, Mr. A. E. Berry, Mr. W. Deans, Mr. W. E. Finch, Mr. Wm. Innes, Dr. N. H. Poynton, Mr. F. W. Pritchard, Mr. C. W. Richards, Mr. J. K. Wilson; hon. auditors, Mr. R. E. Dexter, Mr. F. C. Seager; secretary, Mr. W. A. Williams (British Disinfectant Manufacturers' Association).

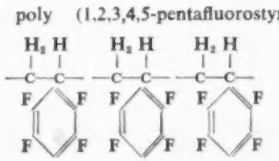
U.S. WORK ON FLUOROCARBON POLYMERS

For High-Temperature and Radiation-Resistant Materials

TO obtain solid polymeric materials with increased stability, the National Bureau of Standards, Washington 25, D.C., has been conducting a research programme on the synthesis of fluorocarbons. It is believed that totally fluorinated aromatic materials would have greater resistance to high temperatures than any polymeric materials now available. For this reason, the Bureau's programme, under the direction of Dr. Leo A. Wall of the polymer structure laboratory, is being guided toward production of aromatic fluorocarbon monomers—which can be used as starting materials and intermediates—and toward conversion of these substances to suitable polymers.

Recent publication (1) (2) (3) of methods for the synthesis of hexafluorobenzene (C_6F_6) in reasonable yields and quantities, has greatly accelerated progress in the field of completely fluorinated aromatic polymers. Hexafluorobenzene is an excellent starting material for the syntheses of some new monomers and polymeric compounds containing the perfluorophenyl or perfluorophenylene group. For the formation of polymer chains, derivatives of hexafluorobenzene that have at least two reactive functional groups are required. There are also structures contemplated in which the perfluorophenyl group is pendant (branch or side) to the polymer chains. For this purpose monofunctional derivatives are also of great value. The uses of the two types of derivatives can be illustrated by consideration of two molecular structures, polyperfluorophenylene

and poly (1,2,3,4,5-pentafluorostyrene)



The former, having a molecular weight of about 2,000, was prepared a few years ago from diiodotetrafluorobenzene while the monomer of the latter was recently produced from pentafluorobromobenzene.

For the desired properties of high thermal stability and plasticity, linear flexible molecular chains, with a large number of configurational possibilities and strong chemical bonds between all the atoms in the molecule, are needed. A structure approaching this ideal is polyperfluorophenylene ether. Conversely, polyperfluorodiphenylsiloxane polymer has a bulkier structure with considerable steric hindrance between the pendant pentafluorophenyl groups. It is evident that this polymer cannot be coiled without breaking bonds.

Hexafluorobenzene: A number of suitable intermediate compounds for making high-temperature polymers have been prepared from hexafluorobenzene. In one method, pyridine has been selected as the solvent because it promotes certain nucleophilic (proton-seeking) reactions, especially with oxygen-containing bases (4). Addition of methanolic sodium hydroxide to the hexafluorobenzene-pyridine solution produces pentafluoroanisole (3), and addition of solid potassium hydroxide to this same solution produces pentafluorophenol (4). When alcoholic potassium hydroxide is used as the base, pentafluorophenol, tetrafluorodihydroxybenzene, pentafluorophenetole, and a small amount of tetrafluorodiethoxybenzene are obtained. In liquid ammonia, pentafluoroaniline (5) is produced from sodamide and benzene.

Hexafluorobenzene Reduction

Hexafluorobenzene can be readily reduced by hydrogen with a platinum catalyst. The main products of this reduction, pentafluorobenzene and tetrafluorobenzene, can be brominated to pentafluorobromobenzene and dibromotetrafluorobenzene or iodinated to the analogous iodides. Since these compounds contain readily displaced atoms—bromine or iodine—in active sites, they can be used to prepare other aromatic fluorocarbons that cannot be directly synthesised from hexafluorobenzene. This is a step nearer the production of improved heat-resistant polymers.

Such reagents as methyl magnesium iodide can replace one or two of the fluorines in hexafluorobenzene to produce 1, 2, 3, 4, 5-pentafluorotoluene, or one or more of the possible tetrafluoroxylenes. Since the hydrocarbon methyl group is easily oxidised to the carboxylic group, a relatively easy route to dicarboxylic tetrafluorobenzene, another polymer precursor, is obtained. Attempts to prepare such derivatives as sodium pentafluorophenyl, however, have produced vigorous explosions.

Radiolysis of hexafluorobenzene has shown that in the presence of high-energy radiation, the major products are larger molecules similar in nature and quantity to those found in benzene that has been irradiated. Thus aromatic fluorocarbons appear to have the same high order of radiation resistance as aromatic hydrocarbons. At high temperatures these fluorocarbon polymers, such as polyperfluorostyrene, may be expected to exceed the aromatic hydrocarbon polymers in radiation resistance.

Pentafluorobromobenzene and its Grignard Reagent: Grignard reagents (RMgBr) are suitable tools for synthesising different types of complex aromatic fluorocarbons. For example, the availability of the pentafluorophenylmagnesium bromide will permit the eventual synthesis of many different and complex aromatic fluorocarbons. Pentafluorobromobenzene, which is obtained as a by-product in the preparation of hexafluorobenzene by pyrolysis, can be readily converted to a Grignard reagent, which reacts with acetaldehyde to form pentafluorophenyl-α-ethanol. This resulting alcohol can be dehydrated at 350° C by alumina pellets to 1, 2, 3, 4, 5-pentafluorostyrene.

The preparation of perfluorostyrene, polymers of which are expected to exhibit good radiation resistance, is also an objective of the Bureau's work. At present, coupling reactions involving Grignard reagents have proved unsatisfactory; however, reactions with the pentafluorophenyl Grignard and tetrafluoroethylene are being explored. Reactions of the Grignard with various alkyl iodides lead to exchange and not to the desired coupling. With cobalt chloride, the pentafluorophenyl Grignard will react by coupling to form the perfluorodiphenyl.

A better synthesis of perfluorodiphenyl is by the Ullman condensation of pentafluorobromobenzene in a sealed tube at 250°C. With the silicon tetrachloride and phosphorous trichloride, the Grignard has been used to give the tetrakis-(pentafluorophenyl)-silane and tris-(pentafluorophenyl)-phosphine. Reaction with tin tetrachloride and boron trichloride should readily produce similar derivatives.

Aliphatic Fluorinates

Condensation of Aromatic Amidines or Nitriles: It has been shown that aliphatic fluorinated compounds (6) such as the perfluoroalkyl nitriles and dinitriles react with ammonia to form perfluoroalkylaminides or diamidines, and these condense to form polymers. An analogous reaction with aromatic substances would be pentafluorobenzonitrile (recently synthesised at the Bureau) and perfluorophthalyldinitrale forming, respectively, pentafluorobenzamidine and perfluorophthalydiamidine. Since the aliphatic polymeric amidines are bonded through the triazine structure, corresponding polymeric structures resulting from the aromatic amidines—and consequently incorporating the triazine—would have additional stabilising resonance energy. This energy, created by the conjugated (i.e., having alternate double and single bonds) completely cyclic structure, would provide the amidine with greatly improved thermal stability. Then, too, the material would possess excellent rubber-like properties over a wide range of temperature due

to the numerous possible configurations in which such a structure may exist. The Bureau considers that combinations of an aromatic and an aliphatic perfluoroamidine may produce copolymers with other improved properties.

Perfluoroaromatic ethers: Sodium and silver pentafluorophenolates were prepared from pentafluorophenol. When the sodium derivative was thermally decomposed in a vacuum, the main products were an alkali-insoluble solid and a brown tacky gum. The white solid, when pure, melted between 163° and 165°C and is believed to be the ortho dimer of pentafluorophenolate, while the gum is believed to be a low-molecular-weight polyether derivative. Research is being continued to increase the molecular weight of this polymer.

Efforts to prepare the perfluorodiphenyl ether from the sodium pentafluoroether and hexafluorobenzene have been unsuccessful. Apparently the pentafluorophenol is a strong acid, and since its sodium salt is a neutral compound, the reaction mixture is not sufficiently basic to attract fluorine from a hexafluorobenzene ring. However, a small yield was obtained from the silver salt and hexafluorobenzene.

Although attempts to pyrolyse the silver salt in a sealed tube at 200°C resulted in an explosive reaction, this same silver compound could be heated for several hours without detonation when a trace of iodine was added. It is possible that the iodine inhibits the formation or decomposition of perfluorodiphenyl peroxide which might decompose explosively on heating.

Unlike the sodium salts, the silver salts have the added property of photochemical decomposition and may react to form polymers that it is not possible to obtain with the sodium derivatives. A polymeric glassy substance was obtained from silver pentafluorophenolate and trifluoroiodoethane after illumination with a 250-watt photoflood light for six hours. As yet, it is not certain whether this product is a polyperfluoroethylene, a polymer of perfluorophenoxytetrafluoroethylene, or some iodine compound.

When the silver salt was pyrolysed or decomposed by illumination, none of the dimeric products that were obtained with the sodium derivatives were observed. This result is probably due to steric inhibition caused by the large silver molecule.

Numerous other fluorinated aromatic compounds are being studied by the Bureau. Each of the new materials synthesised is capable of further reactions to produce still more perfluoroaromatic monomers and related compounds.

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Determination of Water: Addendum to B.S.

WHEN B.S.2511, for determining water by the Karl Fischer method, was published in 1954, it was indicated that the method as given was not applicable, without modification, to the determination of water in ketones, because these react with constituents of the Fischer reagent. The addendum now published as part 4 of the standard gives the modifications necessary to the electrometric procedures in parts 1 and 2 of the 1954 edition to permit the determination of water in ketones.

Addendum No. 1 (1959) to B.S.2511 may be obtained from the British Standards Institution, Sales Branch, 2 Park Street, London W.1, price 2s (postage will be charged extra to non-subscribers).

Completing Outside Work in Any Weather

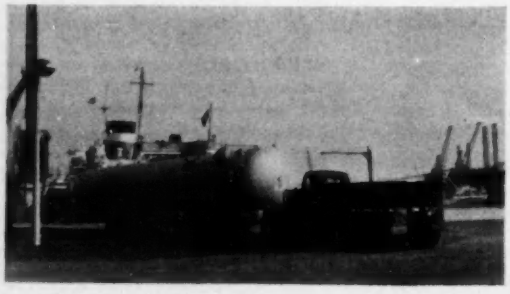
BY using a Visqueen envelope with a capacity of 400,000 cu. ft., looking rather like a gigantic greenhouse. Tarslag Ltd. recently completed the control room of a power station at Greatham, West Hartlepool, in bad weather in three months instead of the usual six months.

Visqueen polythene film is made by British Visqueen Ltd., an I.C.I. subsidiary.

New Zineb Fungicide

A new zineb fungicide, Shell Zineb, is available from Shell Chemical Co. Ltd. in the form of a fine wettable powder. It is primarily for the control of blight on potatoes, but it is also suitable for horticultural use and will control many diseases of market garden crops.

Chlorine Tank for Neoprene Factory



This chlorine storage tank, 67 feet long, is being manoeuvred by a Scammel Constructor on to the Ionic Ferry at Preston on its way to the neoprene factory of Du Pont Co. (U.K.) Ltd. at Maydown, N. Ireland

Salters' Fellows Entertained to Dinner

PAST fellows of the Salters' Institute of Industrial Chemistry and those who had been elected to Salters' fellowships prior to the foundation of the Salters' Institute, were entertained to dinner recently by the Master, Wardens and Court of Assistants of the Worshipful Company of Salters. The fellows were invited to meet a representative company of distinguished scientists, mainly chemists.

Main purpose of the institute has been the election to Salters' fellowships of young chemists of high scientific qualifications who have also given evidence of personal qualities which would enable them to advance to positions of responsibility in the technical control of industrial operations. Since 1894 appointments to fellowships have numbered 129 of which 98 have been awarded since the formal inauguration of the Salters' Institute in 1918.

Among its other activities the institute also makes grants to centres of chemical engineering in the universities and technical colleges for the provision of equipment and to help needy students; it sponsors lectures at the Royal Institution for schoolboys and girls, and provides exhibitions at certain public schools for boys studying science and mathematics.

U.K. Supplies Sulphuric Acid Plant to U.S.S.R.

NORDAC LTD., Uxbridge, Middlesex, have recently concluded a contract with V/O Techmashimport of Moscow for the supply to the U.S.S.R. of sulphuric acid concentration plant to the value of £90,000.

The plant will have an output of 24 tons a day of 78% sulphuric acid, the starting acid being an effluent of about 16% sulphuric acid. Heat for evaporation will be supplied by combustion of heavy fuel oil.

Hose Fracture Leads to Shell Haven Ammonia Leak

WHEN ammonia was being discharged at the Shell Chemical Co.'s site at Shell Haven, Essex, on 11 April, a hose line became fractured and fumes drifted to the canteen where workers were having their lunch.

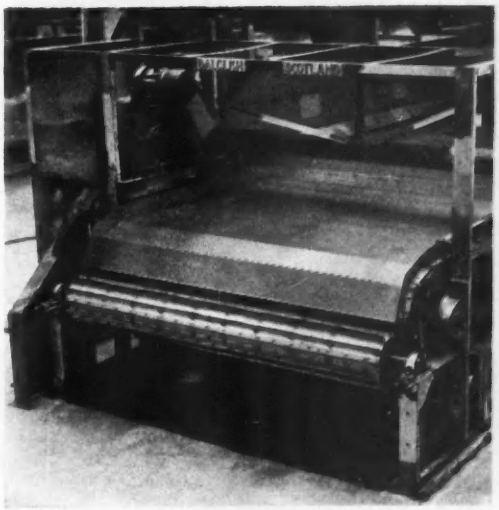
Nineteen were attended to at the medical centre on the site and three were sent to hospital. Of these one was discharged the same afternoon and the others three days later.

There was no interruption of construction work on the site.

Hormone Weed Killer for Bracken Control

After trials over three years in Scotland it is claimed that bracken can be cleared by spraying with Weedone Brackontrol—a low-volatile hormone weedkiller formulated originally in U.S. by Amchem Products Inc. Weedone Brackontrol will be manufactured in the U.K. under licence by A. H. Marks and Co. Ltd., Wyke, Bradford.

Key Role For British Tunnel Dryers in Europe's First Butyl Plant at Port Jerome



Close-up of the end of one of the dryers under construction at the Glasgow works of John Dalglish and Sons, who are the British associates of Proctor and Schwartz

THE two large tunnel drying machines of the synthetic rubber factory now in production at the new petrochemical plant at Port Jerome, near Le Havre, France, may perhaps be the forerunners of a valuable export trade in machinery of this kind for the British manufacturers, John Dalglish and Sons Ltd., Thornliebank, Glasgow. This Scottish firm is at present completing a further order worth about $400,000 for rubber drying machinery for Japan.

The French plant is owned and operated by the Societe du Caoutchoue Butyl (SOCABU), a consortium representing French oil, rubber, and chemical production interests. The shareholders are: Compagnie Francaise de Raffinage, Esso Standard S.A.F., Michelin, Dunlop, Kleber Colombes, Kuhlmann, Rhone Poulenc, Nobel Bozel, Pechiney, and Ugine. The group will be the sole producers of butyl rubber in Europe, and the planned capacity of the plant at Port Jerome is 20,000 tons a year. As this figure is about double France's own requirements, the group expects to develop a world-wide export trade.

Proctor and Schwartz

The tunnel dryers (CHEMICAL AGE, 18 June 1958, p. 1201) have an important role to play in the attainment of this large volume of production. Standard Oil's successful butyl rubber installations at Baton Rouge, Louisiana, were built by Proctor and Schwartz, Philadelphia, who have since supplied all the butyl rubber dryers for factories in the U.S. and Canada.

Since 1956 when John Dalglish and Sons became the British associate of Proctor and Schwartz, the full range of production of the Philadelphia firm's industrial drying equipment has been offered as products of the Scottish firm's works at Thornliebank. As the Dalglish-built tunnel dryers in France are the first to be erected abroad under these arrangements, it is now possible to detail some of the features of technical interest in the construction of synthetic rubber drying machinery as a result of the British firm's experience in the work done for the French project.

Each of the two machines has a designed output of 3,450 lb. of dry product per hour. The drying chambers are 50 ft. long, and the two machines are each set at an angle of 7° to the factory floor. This deviation from the horizontal allows the dried rubber to drop into storage bins at ground level as it leaves the flat single pass conveyor and this also permits the installation of subsequent process machinery under the delivery end of the conveyor without the expense and difficulty of having to dig a pit below ground level.

The rubber, in the form of spongy agglomerate particles ranging from ¼ in. to ½ in. reaches the feed end of the dryers in a comparatively narrow stream. It is spread evenly across the full width of the conveyor band by a revolving scroll arrangement having right and left helices. The speed and height of this scroll may be varied during operation.

The conveyor carries the particles through four separate temperature-controlled compartments installed with fans. Drying air is drawn through gilled tube steam-heaters, directed by the fans into the bed of synthetic rubber particles, through perforations in the conveyor, and recirculated through the heaters. Moisture-laden air in controlled amounts is drawn off by an exhaust system at three points along the length of the dryer.

The conveyor is the standard 8 in. pitch Proctor-Dalglish design having steel links and pins with hardened rollers and bushes. The stainless steel slats, hinged to each other, are suitably reinforced by members running the full width of the conveyor. The piano type hinges used are not subject to wear since all the drying load is carried by steel chain links.

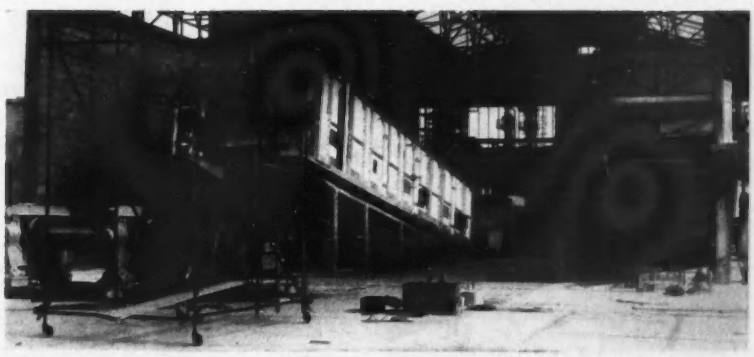
The specially elongated perforations in the slats allow a full flow of air. They also prevent all but the finest of the particles from falling through.

A continuous intermeshing wall runs vertically along the full length of the conveyor, and deep side guards having been mounted at either end of the conveyor slats. There is no leakage of drying air because the outside faces of these side guards are themselves shielded by the fixed side guards. This arrangement also prevents contamination of the chain parts by product fines carried in the air stream.

The driving chain is automatically lubricated. Lubrication is also needed for the conveyor slats since the material concerned has a tendency to stick to metallic surfaces. This problem is solved by introducing silicone fluid sprays at a point immediately preceding the product feed. The conveyor slats are sprayed on both sides.

At the delivery end of the conveyor a doffer roll removes the product which falls into a trough equipped with a left- and right-hand pitched ribbon scroll. This scroll draws the dried synthetic rub-

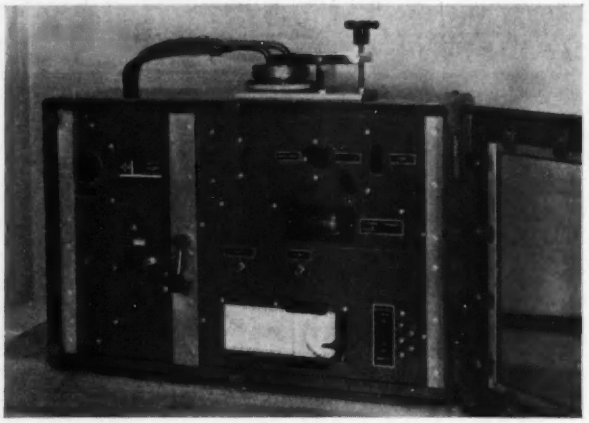
(*Continued in page 666*)



View of the dryers under erection at Port Jerome, showing the 7° angle at which they are set

Southern Instruments to Market Unit-built Swiss Photometers

Industrial and Laboratory Models Available



The Sigrist and Weiss UP2/ID industrial photometer now marketed by Southern Instruments Ltd.

PHOTOMETERS designed and manufactured by Sigrist and Weiss Ltd. of Zurich, Switzerland, are now being marketed by the analytical instruments department of Southern Instruments Ltd., Frimley Road, Camberley, Surrey. These photometers, of which there are two main types, for industrial and laboratory use, are constructed on a unit basis enabling various configurations to be selected by the user for his particular purpose.

The industrial photometer series UP2/I may be supplied for:

(a) Absorption measurements only—Type UP2/IA.
(b) Turbidity measurements only—Type UP2/IT.
(c) Turbidity and absorption measurements—Type UP2/ID.

They can be supplied with or without the following built-in facilities:

(i) Inkless recorder having one or five speeds.
(ii) Single or double alarm or control switches for maximum or minimum values and adjustable over the full scale.
(iii) Single or double potentiometer for transmission and/or control uses of the measured value.

Flame- and explosion-proof execution is available where called for in industrial plants.

Working Principle

The UP2/I series instrument employs the principle of the continuous comparison of two light beams, emanating from the same source and measured by the same photo-electric cell. The light beam is directed alternately between the test cell and the comparison standard by an oscillating mirror. If the light paths are unequal, an alternating current voltage is produced by the photo cell, which is amplified, and used to drive a motor, which moves a diaphragm in such a fashion as to equalise the light arriving at the photo cell from each path.

Complete output of the single light source is alternately passed down each light path (as opposed to the split-beam type employed in other photometers) and thus gives maximum available sensitivity (absorption; transmission difference of 0.01 to 0.1%; and turbidity—smallest measurable turbidity 0.1 p.p.m.). Measured value is determined solely by the equalising diaphragm and the structure of the light path and is therefore entirely unaffected by fluctuations in the light source, alterations in photo cell sensitivity and amplifier drift which are the usual sources of error in conventional photometers.

A direct reading of absorption (range: 366-550 or 550-950mμ) and/or turbidity range: 2×10^{-4} to 6×10^{-2} abs. units) is given on the measuring drum coupled to the equalising diaphragm, to which the built-in inkless recorder is coupled. As stated, remote operation of other recorders or remote control of the process under investigation may be effected by potentiometer attachments to the measuring drum shaft. Suitable potentiometers are available with a d.c. source, if required, and provision is also included for the closure of internal contacts for alarm or control purposes at pre-determined maximum or minimum levels.

Absorption and turbidity measurements are carried out by means of a wide range of flow type cells having various path lengths and types of finish for corrosive liquids and gases. True turbidity (nephelometric) measurements are given by the scattered light reading and not transmission loss as is common with other types of photometer. Filters may be inserted for absorption measurements over narrow bands. Accuracy for absorption and turbidity are reported as 0.5% of full scale.

The Sigrist photometer series UP2/I is a well established control instrument on the Continent where there are several hundred installations. Some typical industrial applications are as follows:

Oil refineries	**Colour control (absorption)**
Biochemical	**Control of cultures (turbidity)**
Water Supply and control	**Filtration efficiency (turbidity)**
Sewage	**Estimation of pollution (turbidity)**
Water pollution	**Effluent control (turbidity)**

A similar principle to that already described is employed in the laboratory photometer UP2/LD series and thus provides a speedy method of routine analysis. Because of the continuous comparison feature, measurements can be taken over any period of time, independent of instrumental variations. This instrument has the same variable unit construction, but is housed in a strong wooden box.

Laboratory type cells of various sizes are available together with a range of individual coloured filters for narrow band absorption measurements and nephelometric standards for turbidity measurements.

The absorption range of this photometer is: with filters 366-950 mμ; with monochromator 400-1,000 mμ.

Turbidity range is 2×10^{-5} to 6×10^{-2} absolute units and sensitivity for absorption is stated better than 0.14% of full scale.

Recent new developments in photometers based on the continuous comparison principle which will be available shortly from Sigrist and Weiss, include the possibility of absorption measurement in a free flowing jet, without the use of the flow-type cell; this will be of special interest in the measurement of liquids which would soil the normal flow-type cell and give reading errors.

Measurement of turbidity from the free surface of a liquid, continuous differential absorption measurements in liquids and gases of both corrosive and non-corrosive types, are now possible.

New B.S. for Pyridine and Related Compounds

FOUR new British Standards for pyridine and related compounds (B.S. 3096/7:1959 and B.S. 3098/9:1959) covering pyridine of 99% and 90% minimum purity and pyridine bases (90/160) and (95/180) have been published in two volumes by the British Standards Institution. The standards lay down limits for impurities and give test methods.

A note in the foreword of the standard for pyridine bases (90/160) indicates that this quality has been approved by the Commissioners of H.M. Customs and Excise for use as a denaturant in the manufacture of mineralised methylated spirit and industrial methylated spirit (pyridinised) under the Methylated Spirits Regulations.

Copies may be obtained from the B.S.I. Sales Branch, 2 Park Street, London W.1. Priced at B.S. 3096/7, 4s 6d, and B.S. 3098/9, 5s.

Overseas News

CHEMICAL PRODUCTION NOW RANKS AS THIRD LARGEST DUTCH INDUSTRY

ACCORDING to a report on Holland's chemical industry issued by the Association of Dutch Manufacturers (free translation of the Vereniging Nederlands Fabrikaat) and the Association of the Dutch Chemical Industry (Vereniging van de Nederlands Chemische Industrie), a turnover of between 2,500 and 2,600 million guilders was attained last year (current rate of exchange of about 10½ guilders to the £). With the total industrial turnover of Holland standing at 30,800 million guilders last year, the chemical industry proved 1958 estimates by taking over third place in the country's scale of economic importance from the textiles industry. At the end of the year there were some 400 manufacturing concerns operating in the Dutch chemical industry, employing 67,000 workers and staff. Export in 1958 accounted for about half the total chemical industry turnover, and chemical exports formed one-tenth of all Holland's industrial and agricultural exports. After the U.K., West Germany, France and Italy, Holland holds the fifth place as a West European producer of chemicals.

A picture of the recent growth of the chemical industry in Holland in comparison with industrial growth at large is given by index figures quoted by the two organisations in their report. Taking 1953 levels as 100, in 1954 both the general industrial index and the chemical industry index stood at 110, in 1955 the industrial index was 118 and the chemical index 117, in 1956 the industrial index was 123 and the chemical index 124, in 1957 the indices were respectively 126 and 133 and last year they stood at 126 and 136. Only the metal industry showed a greater expansion over the period, with a 1958 index of 137, but this index was equal to that of the previous year and two points down on the 1956 figure, so recent expansion is considerably behind the chemical industry's achievement.

A great overall increase is noted for the turnover and export amounts achieved by various branches of the Dutch chemical industry in 1958; exact totals for the year are not yet available.

Formation of Proylene and Ethylene from Isobutylene

Five Russian scientists headed by W. D. Moisseyev describe in the latest report of the Scientific Academy of the U.S.S.R. formation of propylene and ethylene by the cracking of isobutylene. An examination of the speed of formation of propylene by the cracking of isobutylene (285 Torr, 542°C) conducted under the kinetic isotope method (^{14}C), states the study group, proved that a considerable proportion of the propylene was formed not directly from the isobutylene but from the intermediate products. Speed of formation of the propylene first increases, then slows down again after the first 14 minutes of the formation process. The formation of the ethylene results only partly from propylene, the rest forming either directly from the isobutylene or from the liquid products produced from the isobutylene.

New Antiknock Additive

Texas Co., New York, US, have a new antiknock additive TLA (tetraethyl lead appreciation) for petrol. The compound is *tert*-butyl acetate, made by reacting isobutylene and acetic acid. TLA acts synergistically with TEL and is stated to be most effective at a concentration of 0.75% by volume in gasoline containing 3 cc. per gall. of TEL. Texaco claim that it raises 100 octane fuel to 101, and 104 octane to nearly 106.

Petrochemical Industry for Argentine

Petrochemical plants are to be erected in the Comodoro Rivadavia oilfields area of Argentina by the U.S. organisation, Texas Butadiene and Chemical International, which propose to invest between $40 and $67 million. Natural gas supplies are available in the area but as these may initially be insufficient, the company plans to build a refrigerated deposit for the storage of supplies of butadiene to be purchased from the San Lorenzo refinery of the Y.P.F. (the Government oil monopoly company).

One of the plants to be established will produce about 30,000 tons yearly of butadiene which, with the output of other plants in the area, would be sufficient for an annual output of 40,000 tons of synthetic rubber, capable of expansion to 60,000 tons yearly. Another of the proposed new plants will produce some 13,000 tons of carbon black.

Highly Fluorinated Alcohols Key to High Temperature Lubricants

Highly fluorinated alcohols may be the key to lubricants satisfactory for use at the high temperatures anticipated in future military jet engines, according to two research chemists from E. I. du Pont de Nemours and Co., E. C. Ballard and E. E. Sommers.

Prepared from tetrafluoroethylene and methyl alcohol by telomerisation the fluoro alcohols can be reacted with selected di- or polybasic acids to form esters which appear to have the required oxidation, thermal and hydrolytic stability for high temperature operation. Most promising compounds so far are a fluoroalkyl camphorate and a fluoroalkyl pryomellitate.

Oxidation tests on these fluoroesters, the Du Pont chemists report, indicate that the camphorate can be used at bulk oil temperatures up to at least 400°F while the pyromellitate extends the usable temperature range another 100° One drawback yet to be overcome is that the fluoroester lubricants do not possess excellent viscosity and low temperature properties.

New Chemical Pharmaceutical Association Formed in Italy

A new chemical-pharmaceutical association, Pharmindustria, has been established in Rome. Carlo Erba, Farmitalia, Lepetit and Squibb are included in the list of its founder-members. Apart from the usual tasks common to such associations, Pharmindustria will also promote the interests of the Italian chemical-pharmaceutical industry within the Common Market.

Chemical Production Targets for Bulgaria

Bulgaria has set 1962 as its target year. By then an output of 330,000 tonnes nitrogen fertilisers is expected (1957 figure: 122,600 tonnes); phosphorus fertilisers, 560,000 tonnes (1957: 170,000 tonnes); calcinated soda 243,000 tonnes (1957: 94,500 tonnes); sulphuric acid, 300,000 tonnes (1957: 40,000 tonnes); and plastics, 8,340 tonnes (1957: 1,334 tonnes).

£2 million Soda Ash Plant for South Africa

A South African mining concern, Federale Myneoumaatskatty Beperk, is reported by Barclays Bank D.C.O. to be planning to set up a £2 million soda ash plant in the Sasolburg area. This would make the Union virtually independent of outside sources of this chemical. Capacity production will not be reached for two to three years, but large savings in foreign exchange will accrue from the development.

Rumanian Plans to Raise Chemical Outputs

Better use of existing facilities and the commissioning of new plants are expected to increase the volume of Rumania's chemical production by 27.5% during 1959. Among new plants due on stream this year is a p.v.c. unit at Turda with a 5,500 tons a year capacity. At Fagaras, a nitrogen fertiliser section is to be set up with an annual capacity of 100,000 tons of ammonium nitrate and a phenol section that will produce 3,000 tons a year.

Output of chemical fertilisers is to be raised from the 1958 total of 152,000 tons to 282,000 tons. The new ammonium nitrate facilities at Roznov are to be commissioned this year.

Production of plastics material will, it is said, rise more than threefold compared with 1958. A new synthetic fibre unit at Savinesti and the Gorova works with an annual output of 150,000 tons of

sodium products are other new projects.

The new Borzesti chemical complex, the largest in Rumania, is to be put into operation. Extending over an area of about 5 km. the overall annual output will amount to some 2,600 million lei.

Austrian Plans for Acetylene from Natural Gas

Oesterreichische stickstoffwerke are studying the erection of a new plant at Linz for the production of acetylene from natural gas. The plant would be connected by means of a 75-mile pipe with the gas pipeline already existing in Lower Austria.

The company is also studying the possibility of building, jointly with Zellwolle Lenzing, a plant for the production of acrylonitrile.

Italian Sulphur Output Down

During the period from 1 July, 1958, to 31 January, 1959, 58,600 tons of raw sulphur was sold and delivered in Italy. This makes about 10.7% less than the 65,636 tons recorded during the period from 1 July, 1957, to 31 January, 1958.

During the same period 14,850 tons of sulphur was exported—a drop of nearly 68%. France was the principal customer, buying 9,970 tons.

Alberta Gas Processing Plant Expansion

Work has begun on expansions at the British American Oil Co.'s gas processing and sulphur plant at Pincher Creek, Alberta, which will raise its daily raw gas capacity from 120 million to 180 million cu. ft. and increase the production of propane, butane and condensate.

The plant supplies gas to Eastern Canada through the Trans-Canada pipeline.

Indian Project to Produce 100 Tonnes of Sulphur a Day

The National Industrial Development Corporation, a State-owned body in India, had announced from New Delhi that it is working on a project for a plant which would transform iron pyrites into sulphur. The plant would produce 100 tonnes of sulphur a day, for which capacity an annual amount of 100,000 tonnes of iron pyrites would be necessary. A Norwegian specialist concern has already tested the pyrites intended to be used and pronounced them satisfactory. Cost of the proposed plant would be in the region of Rs.25 million (some £1¼ million).

B.A.S.F./Argentine Plant for Dyestuffs Intermediates

A joint company of the West German chemical manufacturer Badische Anilin- und Sodafabrik A.G., of Ludwigshafen, and the Buenos Aires concern Compania Quimica S.A.—Fabrica Argentina de Hidrosulfito y Afines S.A.—has now begun production at a plant at San Nicolas, Argentine. The plant's installations use B.A.S.F. processes to produce hydrosulphite and "Rongalit," both of which commodities will be used in the dyestuff industries. The new company, which goes under the abbreviated name of Sulfisid, will cover the whole of the Argentine's continued demand for these products.

Loans for Indian Oxygen Expansion

The Commonwealth Development Finance Company is lending £225,000 to Indian Oxygen Ltd., a subsidiary of the British Oxygen Company, towards an expansion programme which is to cost altogether over £2 million. The balance of the cost is being financed by Indian Oxygen and its British parent company, together with a loan of £337,500 by the Industrial Credit and Investment Corporation of India.

The greater part of the C.D.F.C. loan will be used for the purchase of plant and equipment in the U.K. The aim is to provide additional capacity to enable Indian Oxygen to meet the increased demands for its products expected to arise from the current industrial development in India and in particular the expansion of steel production in the second five-year plan.

Big Australian Contract for Power Gas

The Power-Gas Corporation (Australasia) Pty. Ltd., Australian subsidiary of the Power-Gas Corporation Ltd., Stockton-on-Tees, has received an order worth £A800,000 for one unit of carburetted water gas plant from the Australian Gas Light Co. for their Mortlake Works, Sydney.

The unit will have a normal capacity of 9,000,000 cu. ft. of 500 B.Th.U. gas per day, with a peak load capacity of 12,000,000 cu. ft. per day. It is believed to be the largest single unit of c.w.g. plant ordered in the world.

The unit will incorporate a generator of the dry base type and will utilise the reverse flow carburetting system for the use of heavy oil. A unique feature of the plant is that, except for certain control equipment, it will not be housed, thus following a trend adopted in recent years for catalytic oil gas plants. Many novel features are included in the mechanisation and instrumentation of this plant with a view to keeping labour requirements to a minimum.

Hydrochloric Acid Pilot Plant For Israel

A pilot plant to produce hydrochloric acid by a thermal method from magnesium chloride is to be set up within three months in Israel. The plant will test on an industrial scale the method developed by the late Dr. Y. Aman.

Dr. Aman claimed that it would be possible to separate, at very low cost, the hydrochloric acid from the magnesium chloride, a by-product in the production of potash at the Dead Sea Works. He also suggested that hydrochloric acid could be used in the treatment of rock phosphate which is quarried in the Negev.

West German Chemical Exports Worth £392m.

The West German chemical industry last year exported 26% of its output. Exports, which were 2.5% more than in 1957, were valued at £392 million.

The chemical industry accounted for 12½% of total exports. More than 61% went to European countries, about 23% being to the Common Market.

Colombia Fertiliser Plant to Use Natural Gas

A fertiliser plant being built at Barrancabermeja, Colombia, is expected to start production of ammonium nitrate and urea next year. It will use natural gas from the Shell oilfields at Casabe.

Edison Expansion Plans in Italy

IN their 1958 report Società Edison, Italy, show that of the group's chemical subsidiaries the Sicedison concern, which raised its capital from 16,000 million to 30 million lire during the year, finished the erection of a petrochemical plant in Mantua for olefins for use as raw material in the production of plastics, solvents and cleansing media, and brought into production, also at Mantua, a new plant for the production of phenol.

The plant in Porto Marghera, Venice, reported rising sales in chlorine, soda and p.v.c. and the operation of new production units for hydrocyanic acid and hydrocarbon compounds of chlorine and fluorine. Hydrofluoric acid necessary for the Porto Marghera plant was supplied by another Edison subsidiary, the 800 million lire-capital I.C.P.M. concern, which in its turn increased production of synthetic cryolith and fluorine derivatives. The Sincat subsidiary (capital, 4,000 million lire) is building a synthetic fertiliser plant in Prioli, near Syracuse (Sicily), the potash for which is to come from the Caltanisetta plant at Santa Caterina. Also at Prioli work has begun on the construction of installations for production of polythene, ethylene oxide and other petrochemical derivatives. Soc. Edison has only a 50% interest in this company —Celene, with 3,000 million lire worth of share capital. Credit for the project is being made available by the European Investments Bank, and production is expected to begin this year. Expected to be in operation in 1959 is the synthetic fibre plant of the A.C.S.A. concern (capital of 3,500 million lire). Acrylic fibres will be produced under U.S. licence.

No mention is made in the report of the other main Edison chemical subsidiary, A.P.E., which with a 1,000 million lire capital produces sulphuric acid, phosphate fertilisers and general fertilisers at a plant in Vado Ligure. Some 6,500 chemical workers are now employed by the group as a whole.

PEOPLE in the news

● MR. ARTHUR LEWIS, senior maintenance foreman of Glaxo Laboratories Ltd., Greenford, Middlesex, and MR. H. R. WILLIAMSON, Glaxo production foreman at Ulverston, are taking part in a two-week study tour of German industry organised by the Industrial Welfare Society. Aim of the tour is to broaden experience through the study of the German approach to personnel administration, training, labour relations and welfare.

● MR. G. L. DUNCAN (Aberdeen University) is among those who have been awarded CIBA fellowships for the academic year 1959-60. His award is to study polymer chemistry at Louvain University. Other awards have been made to DR. M. H. RICHMOND (Cambridge and M.R.C.) to study microbiology at Copenhagen; MR. V. P. ARYA (Banaras University and London) to study natural products chemistry at Zurich Polytechnic; MR. J. F. COUNSELL (Bristol) to study physics at Gottingen; MR. K. JONES (Sheffield) to study organic chemistry at Heidelberg; and MR. B. L. MORDIKE (Birmingham and Cambridge) to study physical metallurgy at the Max-Planck Institute, Stuttgart.

● MR. WILLIAM K. GREGSON has been appointed northern area representative of Short and Mason Ltd., 30A London Road, Manchester 1.

● Two brothers who are to co-operate in the editing of 'Comprehensive Analytical Chemistry' are PROFESSOR CECIL L. WILSON, Professor of Analytical Chemistry, Queen's University, Belfast, and MR. DAVID W. WILSON, senior lecturer, Chemistry Department, Sir John Cass College, London. The first volume due this year will be published in three

Professor Cecil Wilson, left, and his brother, David Wilson

parts and will cover classical analysis. Professor Wilson, first to hold a chair in analytical chemistry in the U.K., established a school in the subject in 1947 and was appointed to a readership in 1953. In 1955 he was awarded a D.Sc. for his published work. Both he and his brother were engaged on analytical work for the Government during the war. Mr. Wilson joined the Sir John Cass College in 1946. He is hon. secretary of the S.A.C. Microchemistry Group.

● MR. ALEC TAYLOR, manager of the Cellophane sales division, British Cellophane Ltd., has been appointed a director of the company. A graduate of Manchester University, Mr. Taylor joined British Cellophane Ltd. in 1938 as a general trainee. He became personal assistant to the commercial manager in 1950 and assistant sales manager two years later. In 1954 he assumed the post of sales manager, and in 1957 was appointed to the executive committee of the company. Mr. Taylor, a fellow of the Royal Statistical Society, is 43.

Alec Taylor

W. P. Fletcher

● MR. WILFRED P. FLETCHER has been appointed manager of the new elastomers research laboratory just completed by the Du Pont Co. (United Kingdom) Ltd. at Hemel Hempstead, Herts. The laboratory will provide manufacturers of products made from neoprene and other elastomers with the latest advances in research, testing and manufacturing processes. It will be staffed entirely by British graduates and technicians. Mr. Fletcher, an honours graduate of London University, was responsible for a number of new physical testing developments while associated with the British Rubber Producers Research Association from 1947 to 1958, and supervised the association's investigation work on problems relating to industrial uses of dry rubber products. He entered the rubber industry with the John Bull Rubber Co. in 1939.

● A recent Birmingham University appointment is that of DR. J. R. MORTON, who has become I.C.I. Fellow in Chemistry.

● MR. C. H. GLASSEY has been appointed chairman of British Industrial Plastics Ltd. and has resigned as managing director. MR. E. R. CRAMMOND has relinquished the chairmanship but remains a director advising the company on financial matters. MR. J. E. BEARD and DR. W. BLAKEY, who have been executive directors for a number of years, have been appointed joint managing directors and MR. S. GIBBS and MR. F. E. MILLS have been appointed executive directors.

● MR. I. E. WILLIAMS has been appointed secretary of Quickfit and Quartz Ltd., makers of interchangeable laboratory glassware, of Stone (Staffs), in succession to Mr. J. C. Steer. Announcing Mr. Williams's appointment, Mr. Brian H. Turpin, managing director, said: "Mr. Williams must be one of the few company secretaries who have worked on the factory floor and know the business from tool room to board room." Mr. Williams joined the company in 1947 in the glass-grinding department. He transferred to the accounts office, studied accountancy in his spare time and qualified within two years. In 1952 he became chief accountant.

● MR. R. A. SENIOR has been appointed director and manager of John Thompson Instrument Co., of Wolverhampton. He joined the company 12 months ago to fill the newly created post of sales manager and since then, the company has doubled its manufacturing range and has entered the temperature control field of instrumentation. For a number of years Mr. Senior was Midlands area manager for Kelvin and Hughes.

● MR. E. J. LASSEN, who has been export manager of Bakelite Ltd. since the export unit was established in 1945, has retired after 28 years' service with the company. He is succeeded by MR. G. H. JOHNSON, who has been deputy export manager for the past year.

● DR. D. DINE, export sales manager of Machon Products Ltd., has returned to this country after a seven-week tour visiting some of his company's more remote markets. He visited Pakistan, India, Thailand, Singapore, Australia, New Zealand and South Africa.

● PROFESSOR A. R. J. P. UBBELOHDE, M.A., D.Sc., F.R.S., professor of thermodynamics at the Imperial College of Science and Technology, has been appointed director of the Salters' Institute of Industrial Chemistry on the retirement of Sir Alfred Egerton, F.R.S., on 30 June 1959.

Prof. Ubbelohde

Dr. S. H. Jenkins

● DR. S. H. JENKINS, Ph.D., D.Sc., F.R.I.C., F.Inst.S.P., the new chairman of the Midlands section, Society for

Analytical Chemistry (People in the News, 28 March), graduated in chemical technology at Manchester and later received London degrees of Ph.D. and D.Sc. for work on biological oxidation. He was chemist at the dyeing and bleaching works of Robt. Cawley and Co., Crumpsall, from 1924-26, and held a similar appointment in Spain from 1926-27. Afterwards for 11 years he carried out research work at Rothamsted experimental station for the Water Pollution Research Board on the disposal of beet sugar and milk factory waste waters. Among positions he has occupied is the presidency of the Institute of Sewage Purification.

N. L. Paddock, head of Albright and Wilson's physical chemistry section, whose A.C.S. paper on phosphonitriles was reported last week (p. 624)

● MR. WILLIAM H. MCFADZEAN has been elected president of the Federation of British Industries in succession to SIR HUGH BEAVER. He has been chairman and managing director of British Insulated Callender's Cables Ltd. since 1954. MR. D. L. WALKER, C.B.E., general secretary, has retired after 42 years in the federation's service. He has been elected a vice-president and has agreed to accept the appointment of honorary adviser to the federation. MR. JOHN GOUGH hitherto assistant general secretary becomes secretary.

● DR. I. KEMP, who has been chief chemist of Revertex Ltd., for many years, has been appointed to the board as technical director.

● MR. F. L. WARING, managing director of the Coalite group of companies, has been re-elected president of the Association of Tar Distillers for a second year. Mr. Waring has also been elected vice-chairman of the Association of Chemical and Allied Employers, after six years of office as chairman of the chemical group.

● MR. F. S. CLARK and MR. P. G. RENNIE have been appointed directors of Laporte Titanium, a subsidiary of Laporte Industries.

● PROFESSOR FREDERICK HARDY, soil specialist at the Inter-American Institute of Agricultural Sciences, Turrialba, Costa Rica, and DR. J. D. CUMMING, lecturer in physiology at Birmingham University, are being temporarily attached to Persian Universities. Dr. Cumming will be attached to the University of Meshed as lecturer in physiology. Professor Hardy goes to Shiraz University, and the Agricultural School at Ahwaz, as lecturer in soil chemistry. In Shiraz he will advise the faculty of agriculture on the completion of its soil chemistry laboratory in the form most suitable for research and, as a chemical fertiliser production plant is soon to be built in Shiraz, he will also advise on the correct use of fertilisers. Professor Hardy, 70, was born in Bradford, Yorkshire, and educated at Bradford Grammar School and Peterhouse, Cambridge. Dr. Cumming, 29, was educated at King Edward VI School, Stourbridge, Worcestershire, and at Birmingham University.

● MR. G. W. MACKENZIE, of Johannesburg, has been appointed non-executive chairman of Fison's board of directors. He takes up this appointment at a time of considerable expansion resulting from the establishment of the new £2½ million factory at Sasolburg, Orange Free State, for the production of superphosphate and mixed fertilisers as well as sulphuric acid.

● THE EARL OF HALSBURY, F.R.I.C., F.Inst.P., who relinquished his position as managing director of the National Research Development Corporation at the end of March, has accepted an invitation to become a director of Sondes Place Research Institute, Dorking, Surrey.

● MR. J. K. HOWARTH, MR. D. H. LYNCH and MR. C. D. MOORE have been appointed to the board of Glovers Chemicals Ltd. MR. J. HOLDSWORTH has been appointed secretary.

U.S.S.R. Delegates Visiting U.K. Plastics Factories

DELEGATES from the U.S.S.R. plastics industry are visiting British factories.

When a three-man delegation paid a visit to the Southend factory of E. K. Cole Ltd., their leader, Mr. Ivan Karataev, vice-president of the Moscow Region Economic Council, said they were investigating the latest developments in the British plastics field with a view to development of their own industry. They were interested in placing orders for entire production lines rather than for individual machines.

The delegates toured the entire plant and also the electronics laboratories, where they showed a keen interest in gauging methods for the production of plastics.

Will

COMMANDER GEOFFREY GLEDHILL TURNER, G.C., G.M., a director of General Kaputine Syndicate Ltd., manufacturing chemists, Oldham, who died on 9 February, aged 55, left £32,551 net.

Tunnel Dryers for Butyl

(*Continued from p. 661*)

ber to the centre. The product falls through a discharge hole to the storage bin at ground level.

Among other problems in the manufacture of equipment of this kind was the corrosive nature of fumes given off by the product in the drying process. This called for a specially-designed drying chamber and a lining of asbestos type insulating panels had to be mounted inside the steel framework.

Fire hazard had also to be taken into account, and the drying chamber was equipped with an automatic sprinkler system designed to operate whenever the temperature inside the dryer exceeds the safety level.

In a dryer of this type, freedom of access is important. There are, therefore, a total of 20 full length doors, 10 on each side of the drying chamber, on each of the two machines. Between the two runs of the conveyor a smooth subfloor is mounted. This floor may easily be swept clear of all fines that may drop through the conveyor perforations.

Phthalic Anhydride Plant for S.W. Tar Distillers

SOUTH WESTERN Tar Distillers Ltd., Ealing House, Totton, Southampton, have recently signed an agreement with Saint' Gobain, Chauny and Cirey of Paris, for the design of a phthalic anhydride plant similar to that recently built by them in France.

This plant, which will have a capacity of 3,000 tons per annum, will be erected at the Totton works, Southampton, and Burt, Bolton and Hayward Ltd., have been appointed consulting engineers. It is anticipated that this plant will be in production within 12 months.

European Common Market or Free Trade Area?

REFERENCE to turnover in O.E.E.C. countries and to exports made in the report of the recent lecture by Mr. W. A. M. Edwards to the London Section, Society of Chemical Industry (CHEMICAL AGE last week, p. 611), referred specifically to the chemical industry. U.K. exports to Common Market countries totalled $122 million not £122 million.

That 'U.K. chemical exports would only go up 65%' is incorrect. West Germany in 1957 had a 50% share of the chemical exports of O.E.E.C. and of her total chemical exports about 50% went to O.E.E.C. With regard to the remark about the Economist Intelligence Unit, Mr. Edwards said that the E.I.U. had forecast that where with a European F.T.A., the U.K. share of chemical imports to that market might grow from approximately 11 to 14%, if there were no F.T.A. the U.K. share seemed likely to drop to only 4%. The U.K. would thus be losing 10% of the market or some £100 million worth of business a year by 1970.

The 10 'provisos for the F.T.A.' that were listed in page 611 were problems that would arise in free trade, rather than provisos for its establishment.

Change of Address

British Insulated Callenders Cables Ltd. are moving their Cambridge branch office to 65 Devonshire Road.

Hopkin and Williams Offer Reagents of 100% Purity

INCLUDED in the 'AnalaR' series of laboratory chemicals are a number of substances that assay over 99.9% and which are recommended for use as volumetric standards. To meet the demand, however, for reference standards intended for the most highly critical work when agreement between collaborating laboratories has to be established in terms of the second decimal place, Hopkin and Williams Ltd., Freshwater Road, Chadwell Heath, Essex, are now offering a series of chemical substances purified to an ultimate degree. The limited and critically selected standards are potassium dichromate, potassium iodate sodium chloride, potassium bicarbonate and benzoic acid.

Although this number may be further augmented, the substances will be strictly limited to those that display suitable characteristics and conform to certain general principles. Only such substances as appear capable of purification to the point where they may reasonably be accepted as of 100.00% purity ('*AnalaR' Standards* for Laboratory Chemicals, 5th Edit., 1957). Processes used for purification are those which have been proved to reduce the associated impurities. Removal of the last traces of water or other volatile component, Hopkin and Williams recommend, is usually best carried out by the user immediately before weighing. Drying conditions that have been found most appropriate are given on the label of the standard.

The purification process used for potassium dichromate P.V.S., potassium iodate P.V.S. and potassium hydrogen carbonate P.V.S. crystallisation from distilled water (AnalaR) in carefully cleaned boro-silicate glassware. All operations are carried out in a dust free atmosphere and considerable care is taken to exclude all artificial contamination. Sodium chloride is purified by precipitation from its solution distilled water (AnalaR) with pure hydrochloric acid (AnalaR) and under the same conditions as described above.

For purification of benzoic acid Hopkin and Williams have established that the passage of six molten zones through the column used is sufficient to purify the material to such an extent that, after discarding the obviously impure section, no difference in assay can be detected between the extreme ends of the remaining portion. In practice, eight zones are passed through the columns and, after rejection of the impure section the remainder of the column is melted out, is powdered in a glass mortar and then transferred to dust-proof bottles.

Birmingham Work on Submicro Methods for the Analysis of Organic Compounds

IN the April issue of *Science Progress*, (No. 186) published by Edward Arnold (Publishers) Ltd., 41 Maddox Street, London W.1 (price 12s 6d) Dr. R. Belcher, Reader in Analytical Chemistry, University of Birmingham, outlines submicro methods for the analysis of organic compounds (p. 250). He reports that experiments are now in progress to find an effective means for destroying cyanide without affecting chloride in chlorine determinations, and also to extend the method used (**1**) so that chlorine can be determined when other halogens are present.

In the determination of fluoride, it was found that the red complex formed by cerium (III) with alizarin-complexone (**2**) yielded a blue colour with fluoride ions. The nature of the blue compound formed is still being investigated, but preliminary work seems to indicate that fluoride ion forms a new complex with cerous-III-alizarin complexone. The reaction is stated to be unaffected by other halides, sulphate or moderate amounts of phosphate or arsenate. Promising results, Belcher reports, are being obtained in the application of the reaction to the determination of fluorine in inorganic compounds, but at present the accuracy is somewhat short of that desired.

Methods for determination of alkoxyl (**3**) and N-methyl groups (**4**) have been developed; these are small-scale versions of the Zeisel and Herzig-Meyer procedures. There are many sources of error in these determinations, Belcher reports, and close adherence to the specified conditions is essential.

Considerable attention has been given at Birmingham to titration of organic compounds in non-aqueous media and satisfactory methods for determination of salts of carboxylic acids, amino acids, S-alkyl-thiouronium salts, tertiary amines, xanthates, picrates and amine salts have been developed. Both electrometric and visual titrations are used; respective standard deviations are ±0.5% and ±0.7 (**5**). As a result of work on this submicro scale some facts of general interest concerning non-aqueous titrations have come to light.

Some developments in the manufacture, and in the technical uses, of glass, are considered by A. E. Owens, technical sales and service department, Pilkington Brothers Ltd., St. Helens, Lancs (p. 258) and Dr. H. K King, Department of Biochemistry, University of Liverpool, discusses enzyme induction in micro-organisms (p. 293).

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1. Belcher, R., and Youlden, R., *Mikrochim Acta*, 1953, 290.
2. Belcher, R., Leonard, M. A., and West, T. S., *J. Chem. Soc.*, 1958, 2390.
3. Belcher, R., Bhatty, M. K., and West, T. S., *Ibid*, 1957, 4480.
4. *Idem, Ibid*, 1958, 2393.
5. Berger, J. G., M.Sc. Thesis, Birmingham University, 1958.

S.C.I. Engineering Group Elects 1959 Officers

THE chemical engineering group of the Society of Chemical Industry has appointed the following officers: chairman, Mr. R. F. Stewart (Dorr-Oliver Co. Ltd.); vice-chairman, Mr. E. W. Greensmith; hon. treasurer, Mr. F. A. Greene; hon. editor, Mr. D. M. Wilson; hon. recorder, Mr. H. V. Potter; hon. secretary, Mr. J. L. Sweeten; hon. assistant secretary, Mr. F. W. Edwards.

Officers of the road and building materials group, Society of Chemical Industry, appointed for 1959-60 are: Chairman, Dr. T. D. Robson (Lafarge Aluminous Cement Co. Ltd.), vice-chairman, Mr. W. E. Golding, hon. treasurer, Mr. J. C. Warr, hon. recorders, Mr. K. E. Clare (road materials), and Mr. A. H. Thorneloe (building materials), hon. publications officer, Mr. J. H. Nicholas, hon. sec., Mr. H. M. Snashall.

New Laporte Symbol

This new symbol has been devised for use throughout the Laporte Group. It bears the initials of Laporte Industries Ltd., the parent company, and will be used by the operating companies when it will be accompanied by the phrase "A member of the Laporte Group of Companies"

Shell Petrochemicals Course for Teachers

MORE THAN 200 science teachers from public, grammar and secondary schools will take part in a three-day residential course on chemistry and petrochemicals at University College, London, starting on 13 April. Organised by Shell International Petroleum Co., the course is an annual event to show teachers how the sciences they teach are applied in the petroleum industry. A visit to the Shell Chemical Co.'s Carrington plant near Manchester has been arranged.

Lecturers will include, Sir Harry W. Melville, D.S.I.R. secretary, Professor W. T. Astbury, Leeds University, Professor R. L. Wain, Wye Agricultural College; Professor P. V. Danckwerts, G.C., Imperial College, and Dr. V. E. Yarsley, Yarsley Research Laboratories.

Grangemouth Plant Strike

At the time of going to press there had been no settlement of the unofficial strike for height and dirty money at the chemical plant being built at Grangemouth.

The plant is being built for British Hydrocarbon Chemicals Ltd. and not, as previously reported, for Union Carbide Ltd.

TRADE NOTES

Labacta, Blood Agar Base

Labacta, a new blood agar base of interest to bacteriologists and pathologists, has been produced by Bell and Sons Ltd., Liverpool, and is available from J. W. Towers and Co. Ltd., Victoria House, Widnes, who have been appointed sole distributors. Advantages of a single medium which provides the essential nutrients for the various pathogenic bacteria are said to be: production to rigid standards; the composition can be defined exactly; it saves time, labour and laboratory space. Labacta can also be offered without agar to replace meat extract, yeast extract, malt extract and peptones in the manufacture of laboratory media.

Chemical-resistant Plastics

A loose-leaf catalogue produced by I.M.P.A. Ltd., Fountain Street, Barnbrook, Bury, Lancs, is a comprehensive guide to chemical-resistant thermoplastics. It covers materials supplied by the firm and their fabrication services. Tanks, containers, tubes, rods, sheets and fittings made from polythene, p.v.c., nylon, Fluon and other plastics are among the items listed.

Sodium Acetate Prices

With reference to the prices quoted in British Chemical Prices (CHEMICAL AGE, 28 March) for sodium acetate, the following prices are now current, although quotations may vary:—

Sodium acetate, fine white crystals—£73 to £78 per ton delivered.

Sodium acetate, recovered grade—about £60 per ton.

F.B.A. Pharmaceuticals Ltd.

The company, formerly known as Levmedic Ltd., will, from 13 April, be known as F.B.A. Pharmaceuticals Ltd. It will continue to distribute the pharmaceutical specialities of Farbenfabriken Bayer AG, Leverkusen, Germany. Its address at 37/41 Bedford Row, London W.C.1, remains unaltered, as do the telephone numbers (CHAncery 8938/9) and telegraphic address (Levmedic, Westcent, London).

Masonry Treatment Cheaper

Midland Silicones Ltd. announce that the price of their Dri-sil 29 silicone masonry treatment is reduced by 30%.

In three years, sales of Dri-sil 29 both at home and overseas have increased by over 300%. More than 40 British companies now manufacture and supply silicone masonry treatments based on Dri-sil.

Fluon Price Reductions

I.C.I. have reduced the prices of their Fluon polytetrafluoroethylene. The average cost of Fluon granular polymer since March 1956 has been about £2 a lb. The new prices represent, in general, reductions of 13%. Fluon granular polymer was first sold at around £5 a lb. in 1948. Increased output has made possible price reductions to the present level. The I.C.I. Fluon range now includes granular polymer for moulding and extrusion, coagulated dispersion polymer for extrusion and dispersions for a wide variety of applications.

Brilliant Green Pigment

Fenalac Viridine Y, a brilliant and exceptionally fast new green pigment not dependent on the admixture of yellow for its intensity, has been introduced by the pigment department, General Dyestuff Company, a division of General Aniline and Film Corp. It will be marketed in the U.K. by Fine Dyestuffs and Chemicals of Manchester.

Fenalac Viridine Y is made by a process that is a new development in phthalocyanine technology, and uses neither the conventional chlorination process nor yellow pigments. Its chief benefit is its fastness to light, dry cleaning solvents and other colour destructive agents.

The new pigment is available in presscakes, as a dry powder toner, as a calcium carbonate lake, in anionic and non-ionic water dispersible pastes, as flushings in medium soda alkali, and as flushings in dioctylphthalate.

Titanium for Chemical Plant

I.C.I.'s leaflet Titanium for Chemical Plant No. 5 lists the qualities of the metal and advantages of its use in existing plant and new plant and processes.

Smaller Pumps

Introduction of class 'E' insulated motor windings means that Worthington-Simpson can now offer smaller, lighter pumps in their 1½ to 10 h.p. Monobloc range which give the same performance as comparable units previously fitted with class 'A' motors.

An example with class 'E' insulated motor will be shown at the Engineering, Marine, Welding and Nuclear Energy Exhibition. The motor is fitted to a two-stage Vortex pump and is rated at 5 h.p. The pump has a maximum capacity of 520 g.p.h. and a maximum head of 540 ft. depending on capacity. It weighs 175 lb., compared with 216 lb.

Northern Branch

Short and Mason Ltd., scientific instrument makers, of Walthamstow, are opening a branch office at 30A London Road, Manchester 1 (Tel. Central 3044), on 1 May.

Change of Address

The address of the northern sales office of Kingsley and Keith Ltd. is now: 10 Manchester Road, Bury, Lancs. Tel. 2747.

Pyrene-Panorama Ltd.

The Pyrene Co. Ltd. have formed a subsidiary company Pyrene-Panorama Ltd. to take over from Panorama Equipment Ltd., Panorama Equipment (Export) Ltd., and Industrial Protection Ltd., the business of manufacturing and selling safety glasses, goggles, helmets and other safety equipment.

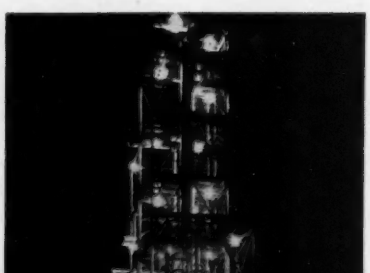
The business of Pyrene-Panorama Ltd. will be operated from Reynard Works, Windmill Road, Brentford, and their registered office will be Great West Road, Brentford, Middlesex.

Metal Containers Agents

Metal Containers Ltd., 17 Waterloo Place, Pall Mall, London S.W.1, have appointed as their sole northern agents covering Lancashire, Yorkshire and Scotland, Turner and Brown Ltd., Davenport Works, Davenport Street, Bolton, for their range of Valethene moulded polythene tanks up to 250 gal. capacity.

Drum-Handling Equipment

The complete range of Drum Master handling equipment for drums, barrels, carboys, bins, cylinders and cases is described and illustrated in publication DBC 4 newly issued by Powell and Co., Burry Port, Carms, S. Wales.



Flameproof lighting supplied by Siemens Edison Swan Ltd.'s Australian company is seen in operation at the new vinyl acetate section at C.S.R. Chemicals Pty. Ltd., Rhodes, New South Wales, which has been erected in conjunction with British Celanese Ltd. at a cost of £500,000

DIARY DATES

MONDAY 20 APRIL

S.C.I.—London: 14 Belgrave Sq., S.W.1, 5.30 p.m. A.g.m. Pesticides group. 'The chemical control of nematodes in soil', by Dr. F. Call.

TUESDAY 21 APRIL

R.I.C.—Chatham: Medway Coll. Technology, Maidstone Rd., 7.30 p.m. Film display.

WEDNESDAY 22 APRIL

S.C.I.—London: 14 Belgrave Sq., S.W.1, 6.15 p.m. A.g.m. Oils and Fats Group. Chairman's address: 'A tour of European oil and fat research centres'. Followed by informal dinner at Cadogan Hotel.

THURSDAY 23 APRIL

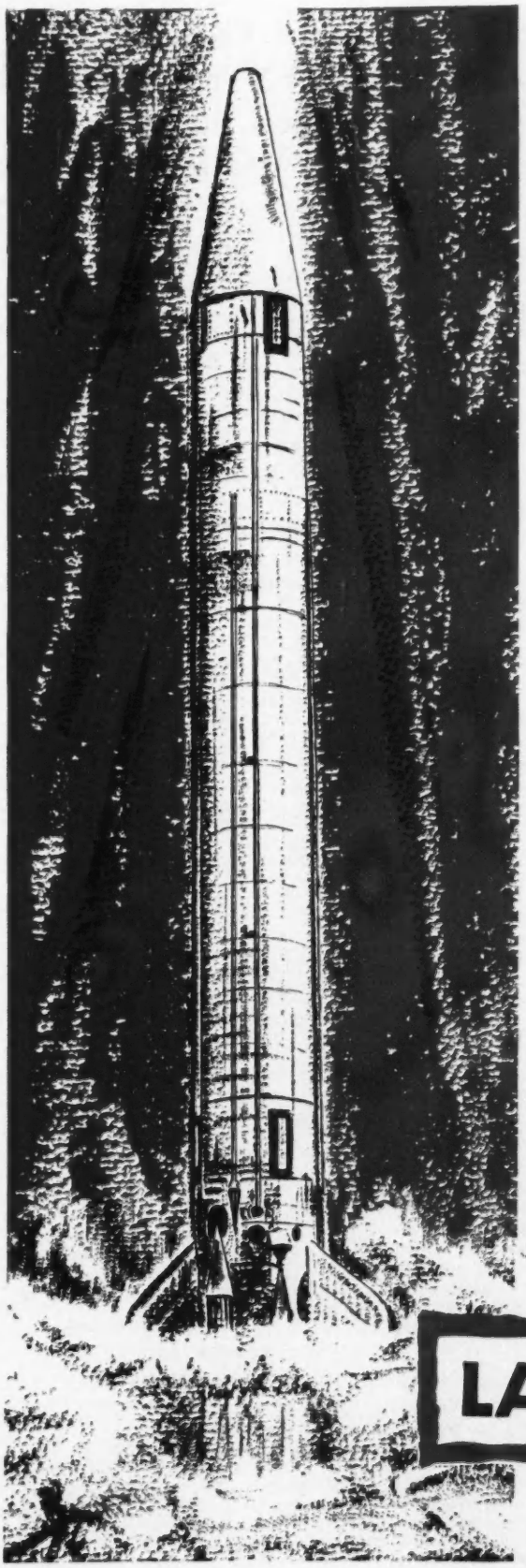
R.S.A.—London: John Adam Street, Adelphi, W.C.2, 5.15 p.m. 'The uranium and thorium resources of the Commonwealth', by Mr. S. H. U. Bowie.

Royal Soc.—London: Burlington House, Piccadilly, W.1, 4.30 p.m. 'Melting and crystal structure. Effects of thermal transformations of ionic crystals on their ultra-violet absorption', by Miss Elizabeth Rhodes and Prof. A. R. Ubbelohde. 'Higher order terms in the dielectric constant of ionic cyrstals', by Mr. B. Szigeti, communicated by Mr. H. Frölich.

FRIDAY 24 APRIL

R.I.C.—Leatherhead: Visits to research centres, 2.15 p.m. At B.C.U.R.A., Randalls Road, 6 p.m., 'Some recent results obtained by the method of flash photolysis', by Prof. R. G. W. Norrish.

S.C.I. with R.I.C.—Cardiff: Univ. Coll., 7 p.m. 'Titanium and its alloys as materials of construction for chemical plant', by Mr. K. W. J. Bowen.



Commercial News

- 89% Holding in Anglo-French Phosphate Sold
- B.P. and Esso Both Report Higher Sales
- Profit Rise for Evans Medical Supplies
- B.A.S.F. Raise Dividend to Bayer Level

Anglo-French Phosphate

Robert Benson, Lonsdale and Co., who secured control of the Anglo-French Phosphate Co. Ltd. last August, have agreed to sell their holding to H. Jasper and Co. Ltd. at a price slightly higher than net asset value. The agreement, in which certain other shareholders have joined, covers about 89% of the capital and an offer will be made to the remaining shareholders.

The Anglo-French Phosphate Co. has sold its holding in Compagnie Francaise des Phosphates de l'Oceanie. The company has ceased trading and its assets are now almost entirely represented by cash. The board will be reconstituted.

William Blythe and Co.

Group net profit for 1958 was £144,689 compared with £152,371 the previous year after tax of £110,419 (£156,380). A final dividend of 15% (20%) makes 20% for the year (25%).

British Petroleum

British Petroleum's consolidated net profit for 1958 at £61.9 million was nearly £10 million higher than the previous year (£52 million) and the final dividend on the doubled capital of £202.4 million is raised from the equivalent of 5% to 6¼%, tax free. This makes 8¾% net for the year on the present capital, against the 1957 equivalent of 7½%.

Consolidated profits before tax and depreciation were £17½ million higher at £168½ million.

Sales of crude oil and refined products were 9 million tons higher at 62 million tons.

British Xylonite

British Xylonite group profits were slightly down at £1,023,877 (£1,090,557) but after a reduced tax charge of £543,000 (£613,000) the net balance was a little higher at £480,877 (£477,557).

The final dividend is raised from 10% to 12%, making 15% for 1958 (13%).

Esso Petroleum

The volume of sales by the Esso Petroleum Co. Ltd. in 1958 was more than 30% higher than in 1957 and constituted a record, but net profit declined from £11.6 million to £7.3 million. The report states that the decline in profit was mainly due to lower selling prices. Group sales and operating revenue advanced from £246 million to £259 million, but charges, etc., were £247 million compared with £230 million. As a result of a change in the basis of calculating the charge for taxation the net profit is £2 million less than it would have been on the old basis. No final dividend is proposed. The interim dividend absorbed £1,725,000. In 1957 dividends took £3,162,500.

Evans Medical Supplies

In addition to maintaining the dividend at 7½d a 5s unit with an unchanged final of 5d, Evans Medical Supplies Ltd. are paying a special sesquicentenary distribution of 2d a unit from capital reserves. A one-for-three scrip issue is also proposed. Group net profit rose from £157,014 to £187,606 after tax of £142,573 (£181,166) including £30,294 (nil) tax equalisation reserve.

Formica International

Formica International Ltd., a De La Rue subsidiary, has been formed as a holding company and will control subsidiaries manufacturing Formica plastics in the U.K., France, Australia, Germany and New Zealand.

The U.S. Cyanamid Company has a 40% interest.

C. E. Ramsden and Co.

Increased competition and higher costs lead to a reduction in the trading profit of C. E. Ramsden and Co. Ltd., Hanley, Stoke-on-Trent. Net profit was £27,180 (£28,344) and the dividend is maintained at 25%.

United Indigo and Chemical

In view of Manchester quotations for United Indigo and Chemical ordinary, clients of Northern Counties Securities have amended the original offer of 1s 6d a 2s share to 1s 9d.

Walker Chemical Co.

The Walker Extract and Chemical Co. Ltd., Bolton, and their associated company, Arthur Ashworth Ltd., Bury, have been merged under the style of the Walker Chemical Co. Ltd.

B.A.S.F.

The decision of the board of the Badische Anilin-und Sodafabrik AG, Ludwigshafen, to recommend a dividend for 1958 of 14% as against a 1957 dividend of 11% has now been consented to and will go before a meeting of shareholders on 15 May. The sum to be paid out for dividend is one of DM.85,680,000 (about £7,140,000), as against DM.61,710,000 (about £5,142,500). A recent cut in company tax and improved business have made this possible. The fact that Farbenfabriken Bayer AG have also recommended a rise in dividend from 11 to 14% seems to confirm expectations that the I.G. Farben successor companies would keep to their tradition of paying the same dividend as one another.

Cilag-AG

Cilag-Chemie of Schaffhausen, Switzerland (formerly known as Cilag-AG), report that in the current year the trading difficulties encountered in the past five years are expected to be overcome. To overcome the difficult trading conditions the company has had to turn all its concentration from the production of orthodox basic chemicals to that of patented specialities in order to win back a place in world markets, it is stated. The remainder of a much higher loss—now only SFr.260,000 (about £21,670)—should be accounted for this year. Overseas subsidiaries of the Swiss company are stated to be now doing very well in Brazil and India and such has been the prosperity of the 94% owned West German subsidiary that its capital had had to be increased by 400%.

Du Pont of Canada

Sales by Du Pont of Canada in the year ended 31 December 1958 rose 12% to $81.7 million, compared with $72.6 million in the previous year.

Net profit amounted to $5.2 million, equivalent to 70 cents per share, compared with $4.5 million or 60 cents a share.

INCREASES OF CAPITAL

Geigy Pharmaceutical Co. Ltd., 15 Norfolk Street, Manchester, 2. Increased by £150,000, beyond the registered capital of £50,000.

Geigy Co. Ltd., 15 Norfolk Street, Manchester, 2. Increased by £1,000,000, beyond the registered capital of £500,000.

Geigy (Holdings) Ltd., 15 Norfolk Street, Manchester, 2. Increased by £1,000,000, beyond the registered capital of £2,100,000.

NEW COMPANIES

CHEMICAL ENGINEERING PREMIER LTD. Capital £1,000. Designing and manufacturing and dealing in chemical engineering plant, electronic and mechanical devices, etc. Directors: F. J. E. China (director of Alchemy Ltd.), L. P. China (director of Premier Colloid Mills Ltd.), A. E. N. Weeks (director of South Eastern Tar Holdings Ltd.) W. E. China and A. J. Beer. Reg. office: Brettenham House, Lancaster Place, London W.C.2.

THOR CHEMICALS LTD. Capital £100. Manufacturers of and dealers in microbiocides, high polymers, resins, fine chemicals, paints and pigments, etc. Directors: Henry J. Hicks, Albert C. W. Bowes, Roy Powell. Registered office: 1 Ethnard Road, S.E.15.

LONDON GAZETTE

Voluntary Winding-up

Notice of a company voluntarily winding-up does not imply liabilities, it is purely formal and frequently is for purposes of internal reconstruction.

COMMERCIAL SOLVENTS (G.B.) LTD. Reg. office: Commercial Road, Bromborough Port, New Ferry, Cheshire. Mr. A B. L. Murison, 31 Gresham Street, London E.C.2, appointed liquidator, 31 March, by members.

NEW PATENTS

By permission of the Controller, HM Stationery Office, the following extracts are reproduced from the 'Official Journal (Patents)', which is available from the Patent Office (Sale Branch), 25 Southampton Buildings, Chancery Lane, London W.C.2, price 3s 6d including postage; annual subscription £8 2s.

Specifications filed in connection with the acceptances in the following list will be open to public inspection on the dates shown. Opposition to the grant of a patent on any of the applications listed may be lodged by filing patents form 12 at any time within the prescribed period.

ACCEPTANCES

Open to public inspection 3 June

Production of uranium metal. Taylor, R. C., and Pickering, H. L. **814 915**

Thiophosphoric acid esters and their use in the control of pests. Ciba Ltd. **814 198**

Acylamino-compounds and process for their manufacture. Ciba Ltd. **814 452**

Stilbene monoazo-dyestuffs and process for their manufacture. Ciba Ltd. **814 391**

Manufacture and use of aldehyde condensation products. Ciba Ltd. **814 288**

Process for the manufacture of quaternary ammonium salts. Ciba Ltd. **814 246**

Tin-coating process. Stahl- und Walzwerke Rasselstein/Andernach A.G. **814 246**

Manufacture of di-imidazole derivatives. Ciba Ltd. **814 249**

Thermoplastic graft polymers. Union Carbide Corp. **814 393**

Paper products containing ion-exchange resins. Rohm & Haas Co. **814 363**

Chromium oxide catalyst and method of preparing and utilising same. Phillips Petroleum Co. **814 295**

Preparation of carboxyalkylated cellulose ethers. Du Pont de Nemours & Co., E. I. **814 457**

Di- and tri-epoxy esters and process for making same. Union Carbide Corp. **814 199**

Mixed ferrites by a co-precipitation process. Steatite Research Corp. **814 180**

Production of titanium. Minister of Supply. [Cognate application 32 526.] **814 181**

Biologically active 2-amino-4-hydroxy-6-substituted pteridine. American Cyanamid Co. **814 462**

Foam inhibition in oils. Union Carbide Corp. **814 200**

Adhesion promoters. Du Pont de Nemours & Co., E. I. [Addition to 772 675.] **814 201**

Method and apparatus for analysing mixtures of gaseous materials by composition modulation. Esso Research & Engineering Co. **814 317**

Method of catalyst preparation. Esso Research & Engineering Co. **814 472**

Thermosetting resin compositions and the use thereof. Ciba (A.R.L.) Ltd., formerly Aero Research Ltd. **814 473**

Processes for activating and reactivating catalysts containing a metal and a metal oxide. Universal Oil Products Co. **814 204**

Optically sensitised silver halide emulsions. Agfa A.G. **814 375**

Process for the grain refinement of primary silicon in eutectic and in hyper-eutectic aluminium-silicon alloys. Verein für Praktische Giessereiforschung and Marx, W. **814 406**

Production of alkoxy-esters and of polyolefinic acids and their salts. Celanese Corp. of America. **814 205**

Coating of titanium. Cleveland Pneumatic Tool Co. **814 326**

Bonding members of different metals and providing a metal layer on one of the members. Borg-Warner Corp. **814 262**

Purification process. Prod Farmaceutici Specializzati Dott. M. Calosi & Figlio, S.p.a. **814 263**

Pesticidal basic esters of phosphorus-containing acids. Imperial Chemical Industries Ltd. **814 264**

Antiseptic compositions. Armour & Co. **814 483**

Method for manufacturing piperazines. Dow Chemical Co. **814 331**

Production of anhydrous sodium sulphate. Courtaulds Ltd. **814 415**

Vaporisation of liquefied low-boiling gases. Metallgesellschaft A.G. **814 209**

Manufacture of linear polyurea derivatives and shaped articles formed thereof. Nederlandse Organisatie Voor Toegepast-Natuurwetenschappelijk Onderzoek Ten Behoeve van Nijverheid, Handel en Verkeer. **814 212**

Process for manufacture of acylsulphanilylthioureas. Veb Farbenfabrik Wolfen. **814 484**

Cyano-substituted aliphatic isothiocyanates. Monsanto Canada Ltd. **814 213**

Production of thiol-phosphoric acid esters. Farbenfabriken Bayer A.G. **814 332**

Process for preparation of aromatic nitro-carboxylic acids. Imperial Chemical Industries Ltd. **814 487**

Thiocyanate compounds. Cassella Farbwerke Mainkur A.G. **814 333**

Fluorinated alkyl ethers and preparation thereof. Pennsalt Chemicals Corp. **814 493**

Device charging a powder layer. Jungfer, L. [trading as Akkumula-torenfabrik Dr. L. Jungfer]. **814 216**

Filters. Whitaker Ltd., R. G. **814 335**

Derivatives of cycloalkanes and method of preparing them. Du Pont de Nemours & Co., E. I. **814 494**

Production of long chain dicarboxylic acids and glycols. Du Pont de Nemours & Co., E. I. **814 219**

Dextro-rotary N-ethyl-alpha-methylphenethylamine and acid addition salts thereof. Sterling Drug Inc. **814 339**

Non-corrosive compositions comprising polymerised olefines prepared with certain catalytic metal compounds. Dow Chemical Co. **814 495**

Production of copolyamides. Inventa Aktiengesellschaft für Forschung und Patentvertung. **814 222**

Protein test indicator. Lilly & Co., E. **814 223**

Preparation of β-ionone. Council of Scientific and Industrial Research. **814 226**

3-5 Dioxo-pyrazolidines bicyclically substituted in the 4-position and a process for their preparation. Geigy A.G., J. R. **814 228**

Corrosion inhibition in steam power plants. Sulzer Freres S.A. **814 508**

Sulphonyl-ureas and process for their manufacture. Farbwerke Hoechst A.G. [Addition to 808 071.] **814 234**

Packaged substances. Monsanto Chemicals Ltd. **814 438**

Manufacture of polyglycidyl ethers of polyhydroxy-1:3:5-triazines. Ciba Ltd. **814 511**

Process for the preparation of acrylonitrile. Knapsack-Griesheim A.G. **814 238**

Phenthiazine derivatives and their preparation. Soc. des Usines Chimiques Rhone-Poulenc. **814 512**

Brazing of beryllium. U.K. Atomic Energy Authority. [Divided out of 788 239.] **814 270**

Therapeutic compositions containing stabilised vegetable extracts. Voigt, H. **814 515**

Purification of N, N-dimethylacetamide. Union Carbide Corp. **814 271**

3, 4-Dihydro-2H-1, 3-benzokazines. Dow Chemical Co. **814 272**

Copperable disazo dyestuffs derived from 5-aminopyrazols. Farbenfabriken Bayer A.G. **814 273**

3-Sulphanilamido-5-methylisoxazole and a process for its preparation. Shionogi & Co. Ltd. **814 276**

Preparation of 2.4.6 unalkylated phenols. Bataafsche Petroleum Maatschappij N.V. **814 278**

Pyridine derivatives and a process for the manufacture thereof. Hoffmann-La Roche & Co. A.G., F. **814 359**

Synthesis of steroids. Olin Mathieson Chemical Corp. **814 279**

Purification of lysine. Du Pont de Nemours & Co., E. I. **814 280**

Production of esters of tertiary alcohols with unsaturated acids. Badische Anilin- & Soda-Fabrik A.G. **814 360**

Refrigerant preparations. Farbwerke Hoechst A.G. **814 446**

AMENDED SPECIFICATIONS

On sale 27 May

21-Halo steroids. Glidden Co. **748 914**

N-Aralkyl-N-hydrocarbyloxyalkyl-halogenated alkanoamides. Sterling Drug Inc. **770 928**

Market Reports

BUDGET MAY LEAD TO LONGER TERM CONTRACTS

LONDON Conditions on the market have shown little change on the week, with the home demand for industrial chemicals remaining steady and the volume of export business running at about the recent level.

It is too soon for the full effect of the Budget reliefs to be felt, but it is reasonable to assume that any expansion in production programmes would lead to longer term contract placings.

Zinc oxide prices were lowered from 13 April, the red seal now being quoted at £92 per ton for 2-ton lots. Elsewhere prices for the most part are unchanged and firm.

There has been a good movement in agricultural chemicals, but new bookings have shown a seasonal decline.

In the coal-tar products market there has been a good outlet for pitch and refined tar, and the demand for cresylic acids has been on a steady scale.

MANCHESTER The past week has seen no marked change in trading conditions on the Manchester market for heavy chemicals, though in some quarters a slight increase in buying activity by one or two of the leading industrial outlets has been reported. Meanwhile, the home-trade movement against contracts has continued on a reasonably satisfactory scale, and there is a fair call for supplies on export account. Quotations are maintained pretty well throughout the range. Fresh business in fertilisers is less in evidence, but deliveries of most descriptions are still going forward steadily.

GLASGOW The trading position during the past week on the Scottish heavy chemical market has shown little alteration. There has been a slight falling off in some directions; otherwise demands have been maintained at reasonably steady levels. Some price alterations have taken place, but mostly the tendency has been to remain firm. Much more interest and activity continues to be shown in agricultural chemicals, both in regard to inquiries and bookings for the coming season.

Big Savings Through Work Study says R. M. Currie

Speaking at Harrogate on 10 April, Mr. R. M. Currie, head of I.C.I.'s central work study department, declared that dramatic results could be achieved by scientific work study. In industrial plant design it had been shown that a 10% capital saving could be made. Mr. Currie told 200 work study officers from industry that this illustration of the value of their work made one ask how much money could be saved nationally; it must run to hundreds of millions of pounds.

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